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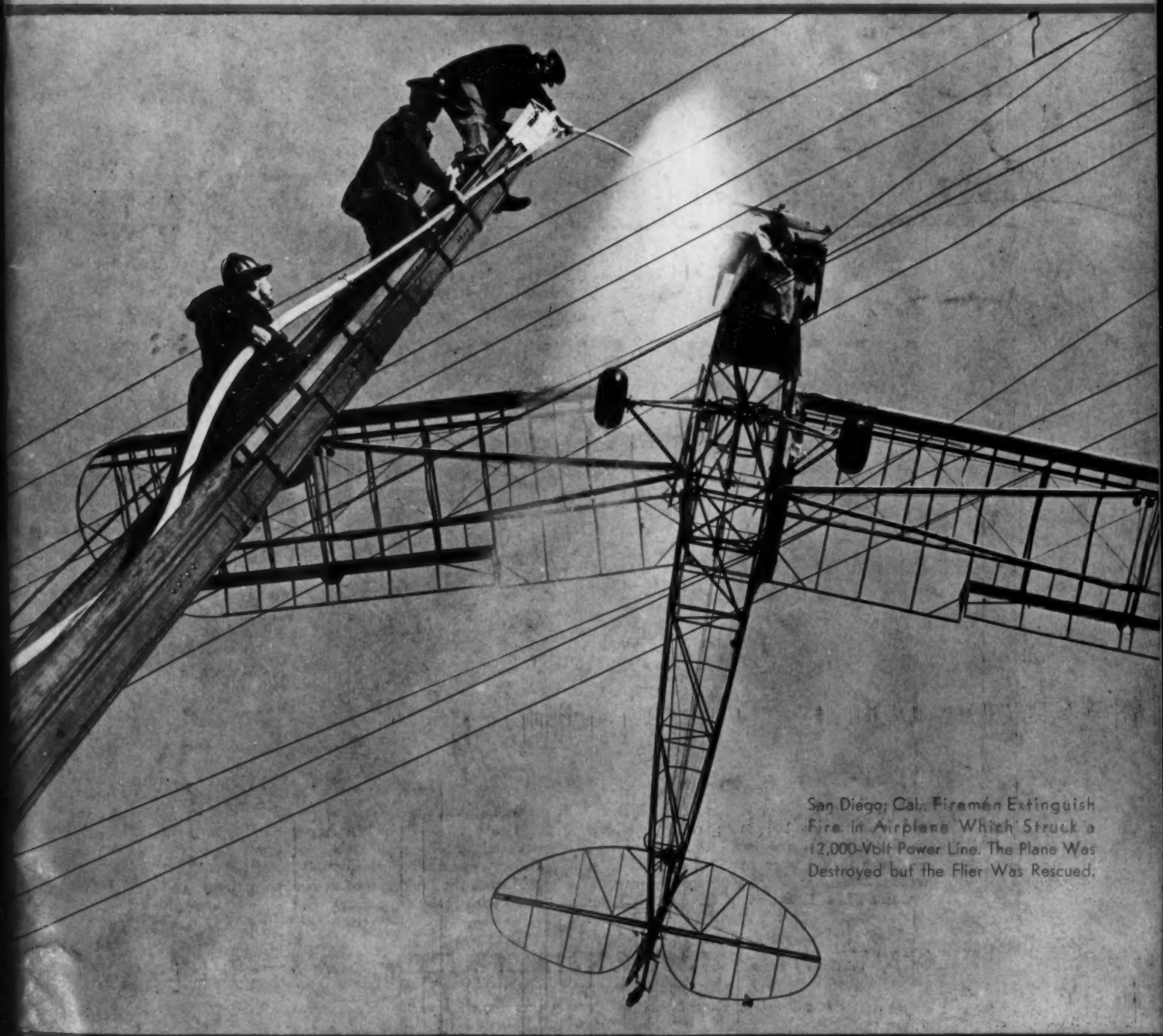
FIRE ENGINEERING

The Journal of the Fire Protection Profession Since 1877

Vol. 92, No. 8 AUGUST, 1939 Member A.B.C.-A.B.P.



San Diego, Cal., Firemen Extinguish Fire in Airplane Which Struck a 12,000-Volt Power Line. The Plane Was Destroyed but the Flier Was Rescued.

14 MACKS NOW ANSWER THE ALARM IN BRIDGEPORT, CONNECTICUT

BRIDGEPORT *knows* the value of Mack apparatus. Since 1934, this progressive New England city has purchased 14 Mack engines —8 pumpers, 3 hose wagons, and 3 ladder trucks. The latest of these is shown above.

Chief Thos. F. Burns of Bridgeport gives other fire chiefs this praise of Mack:

"Our continued yearly purchasing of Macks is based on their superior road and pumping ability plus greater stamina and better service."

Now is the time to modernize *your* department with Mack equipment!

MACK HAS THE FACILITIES TO BUILD THE FINEST IN FIRE APPARATUS — AND DOES!

A USEFUL ADDITION TO ANY FIRE DEPARTMENT

• If you can't afford another regulation pumper, yet need additional equipment for outlying and rural fires—here's your answer. The LaBour Fire Trailer lists for less than a thousand dollars, complete with hose and all accessories, yet its pump will develop 100 lbs. pressure and deliver 150 gallons per minute. That's ample for most of the jobs you're called upon to do. The trailer carries its own engine for pumping, and any passenger car can pull it to the fire.

LABOUR FIRE TRAILER

...IS UTILITY EQUIPMENT

Here are some suggestions as to the way in which this new piece of equipment can solve your problems. The LaBour Fire Trailer:

(1) Pumps from pond or stream. Handles dirty water without damage to pump.

(2) Used as a booster, adds 100 lbs. pressure to line from hydrant to another pumper.

(3) Pumps water from basements and other "clean up" tasks. Small pieces of hard material cause no injury as they go through pump.

(4) Serves as stand-by for regular pumper during repairs. Provides extra equipment for emergencies at low cost.

(5) Reaches fire inaccessible to regular heavy apparatus, thanks to light weight and short turning.

ONE MAN CAN HANDLE IT

One man can move the LaBour Fire Trailer on hard, smooth ground. Equally important, one man can operate it alone, since the pump operates without attention after engine is started, priming itself without manual operation, and renewing prime if air enters suction line.

THE LABOUR COMPANY, INC.

1543 Sterling Ave. • Elkhart, Indiana, U. S. A.

A Consolidation of
FIRE AND WATER ENGINEERING,
THE FIRE ENGINEER and
FIRE PROTECTION

FIRE ENGINEERING

The Journal of the Fire Protection Profession Since 1877

ROBERT H. LOCKWOOD
Associate Editor

FRED SHEPPERD
Editor

N. N. WOLPERT
Assistant Editor

KEEP your eyes peeled for the next issue of FIRE ENGINEERING — our big annual Fire Chief's Convention Number.

● We don't want to let our enthusiasm run away with us, but we have good reason to feel, from the way things are lining up, that it will easily be the biggest and best issue we have ever turned out in all our sixty years.

● Brimful of the kind of editorial material that fire officials will want to keep for year round reference, it will be nearly three times the size of a normal issue. The advertising, too, embracing the products of practically every reputable fire equipment maker, will make it a veritable buyers' reference guide.

● Remember, it's the next issue—September. Don't miss it whatever you do.

The Publishers

IN THIS ISSUE

VOL. 92 AUGUST, 1939 No. 8

Page

With the Editor 335
I. A. F. C. Conference — A Costly Lesson
By Fred Shepperd

Testing Flameproof Fabrics 336
By Ernest F. Hartman, Robert Hicks and Frederick Hartman

Extinguishing Methods Used on Automobile Fires 340

Drill Team Proves Valuable to San Francisco Department 341

Correspondence 342

New Fire Alarm System for Beverly Hills, Cal. 344

Tentative Program for the I. A. F. C. Annual Conference 346

Model of Fire Station Shows Landscaping Effects 347

The Round Table Department 349
Discussion on Leaks in Underground Gasoline Tanks

What's Burning 353

The Watch Desk 355
By Roi B. Woolley

Among the Fire Fans 356
By Otis Smith

Manufacturers' Announcements 357

Convention Dates 358

Promotional Study Course 361
Continued from last issue

Questions and Answers 362

The Cover 365
By William Paul Babcock

False Alarm 366
Humorous Side of the Fire Fighting Profession

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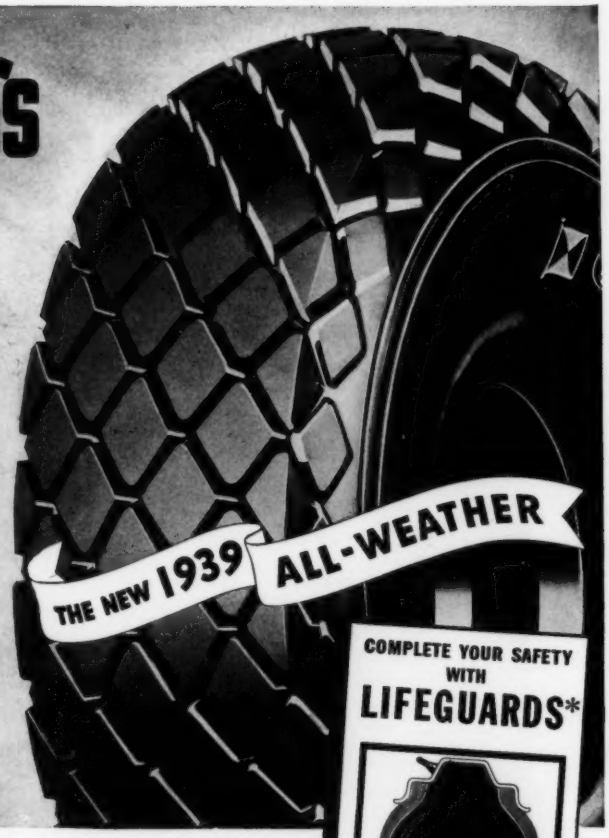
NOW..THE WORLD'S SAFEST TIRE GIVES STILL LONGER SERVICE!

New engineering principles reduce carcass heat, increase bruise resistance, STEP UP TREAD WEAR —AT NO EXTRA COST



TO GIVE FIRE APPARATUS still greater freedom from tire hazards, still greater safety, Goodyear announces a new 1939 All-Weather* truck tire — a *sturdier, cooler-running, farther-traveling* carrier than its famous predecessor long first choice of modern departments.

ITS LONGER TROUBLE-FREE LIFE results from *two* basic engineering improvements—both exclusive Goodyear developments.

ONE IS "MULTIPLE COMPOUNDING"—a new method of building rubber into tires that creates a tougher bond between tread and body—gives much greater immunity from separation.

LOW STRETCH SUPERTWIST* CORD is the other — a more compactly twisted, *lighter gauge,* stronger cord that increases resistance to bruises and fatigue — with less heat-generating bulk, ply for ply, than former tires.

EQUALLY IMPORTANT, this new cord stretches less, reducing tension on the tread and armoring it against cracking and chipping.

ALL THIS ADDS UP to longer tread wear in a tire with maximum All-Weather traction *plus* greater resistance to heat, bruising and separation — *the greatest fire truck tire ever built!*

YET IT SELLS AT NO INCREASE IN PRICE — at all Goodyear dealers'. Specify the new All-Weather on your next order —for longer-lasting safety.

**Trade-marks of The Goodyear Tire & Rubber Company*

THE GREATEST NAME IN RUBBER

GOODYEAR

Beverly Hills Installs Three-Fold Fire Alarm System

Another Profitable Investment in Public Safety

BEVERLY HILLS, the exclusive Pacific Coast residential city with a population estimated at 30,000, joins the continually growing list of cities that are protecting life and property with the **GAMEWELL THREE-FOLD FIRE ALARM SYSTEM.**

The cost, amortized over a 20-year period and including a liberal allowance for maintenance, is approximately $3,750.00 annually. Insurance reductions actually allowed are estimated at $18,102.00 annually on present buildings and contents—**A Profit of $14,352.00 Annually or 373%!**

Make the Gamewell Three-Fold Alarm System Your First Line of Defense Against Fire.

Write for descriptive catalogue

THE GAMEWELL COMPANY
NEWTON UPPER FALLS MASSACHUSETTS

FIRE ENGINEERING

The Journal of the Fire Protection Profession

Volume 92 AUGUST, 1939 No. 8

With the Editor

I. A. F. C. Conference The tentative program for the San Francisco Conference of the International Association of Fire Chiefs, recently announced, points to a highly interesting and instructive meeting in that city. In the Educational Program session alone no less than nine nationally known figures in the educational and fire-fighting fields will participate. And the session on the welfare of the Association will include even a greater number of speakers.

Technical papers on many phases of fire prevention and fire fighting by authorities on the different topics are also included.

Then there will be entertainment every evening, of the caliber for which San Francisco is noted. And, of course, a full day will be spent at the Golden Gate International Exposition.

Make your plans to be present! You'll have opportunity to meet all the leaders in fire prevention and fire fighting in the country, and to hear many of them speak before the Conference.

* * *

A Costly Lesson Fire destroyed an apartment house at Cranston, R. I., on June 18. Three persons lost their lives and seven were injured when flames swept quickly through the third and fourth floors.

Although the structure was of comparatively combustible construction and the fire had a good start when discovered, the loss of life can be credited to undermanning of the department and to lack of equipment.

To the still alarm sent in at 5:43 a.m., two pieces of apparatus responded. These companies were short handed and did not carry sufficient ladders. Though Chief D. F. Young, of the Cranston Department, utilized every available facility in a most commendable manner, the fire traveled so fast that it overtook rescue operations.

Cranston now plans to add more men to the Fire Department. Additional apparatus, too, may be expected. The inquest brought out the very point that Chief Young has always held, namely, that more firemen were needed.

The city has learned its lesson in Fire Department economy, but it is a costly one!

Fred Shepperd

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Testing Flameproof Fabrics

A Study of the Field and Methods of Evaluating Material Treated With Compounds

By ERNEST F. HARTMAN, ROBERT HICKS, and FREDERICK HARTMAN

THE necessity for a workable, easily understood and inexpensive laboratory method to test the efficacy of various fire-retarding preparations designed for use on or in fabrics has been long felt. The statistics of insurance companies show a loss of life, limb and property directly attributable to fires started by easily ignited fabrics in the form of curtains, drapes, rugs, tapestries and even clothing. The U. S. Dept. of Agriculture took a forward step in the field by issuing a bulletin for housewives informing them of a simple method for fire-retarding fabrics. Commercial houses interested in selling patented mixtures have aided. Building codes and safety councils need requirements which would result in fewer fatalities in their communities. These resulted in a specification, drawn up by the U. S. Bureau of Standards, which served as a basis for the tests under discussion.

Tests at New York World's Fair

The scope of the study of flameproof fabric tests was limited to the establishment of standards which fabrics should meet to provide reasonable protection against flame spread and panic hazards and to the evaluation of simple tests for determining the ability of fabrics to meet these standards. This study was undertaken at the request of the officials of the New York World's Fair, 1939, Inc., when they found no existing standards that would fit into an interpretation of their slogan, "The World of Tomorrow." The tests were especially desirable at the time, because of the presence in several World's Fair buildings of materials, which, in their natural condition, are inflammable. For instance, the Cyclorama inside the Perisphere contains quantities of cardboard; many buildings have decorative draperies and hangings; and in a number of instances thatched roofs are employed for scenic effects. Test methods vary with the different materials. This article is limited to a discussion of flameproof tests of fabrics for interior use only.

Treatments Tested

Tests were made on fabrics treated with three different preparations, as follows:

(1) Treated fabrics, finished and ready for test, were obtained from one company representative of those now marketing "flameproof" fabrics. The methods of treating these fabrics are patented or secret, and are usually combined with the process of dyeing or finishing the material.

(2) One of the several chemicals prepared by manufacturers for the specific purpose of flameproofing was obtained and the fabric treated in accordance with the manufacturers' directions. One pound of this salt was dissolved in one gallon of warm water and the fabrics immersed until thoroughly saturated, then wrung hand-dry, and dried at room temperature. The finishing of these fabrics consisted of ironing them when nearly dry with a moderately hot iron. If the fabric was too damp, or the iron too hot, the mixture deposited on the iron, necessitating wiping with a clean, damp cloth.

(3) A solution of 70 per cent borax and 30 per cent boric acid was prepared, and the fabrics treated with it. They were immersed until thoroughly saturated, then dried and ironed in the same manner as those treated under No. 2. This treating solution was considered one of the best in a long series of tests conducted by Ramsbottom and Snoad for the British Fabrics Coordinating Committee and reported to this body in a work which is considered the classic on flameproofing fabrics.

Scope of Investigation

In determining the flameproof qualities of the fabric under test the following reactions must be observed: Flashing flame during application of the igniting agent; flame after removal of the igniting agent; char; glow; and the permanence or lasting qualities of the treatment. By *flashing flame* is meant a flash of flame carried up the length of the test specimens by the fabric itself, and not the rapid burning of a fuzzy edge, which occasionally occurs when the specimen is not cleanly cut out of the sample.

If, when a fabric is ignited, there is an explosive flash of flame, the fabric must be considered as failing in its prescribed purpose, for the reason that such flashing may cause a panic. This is true, even though the flashing might be only momentary, though no flame followed the original flash, and though the fabric itself might be considered flameproof in the broad sense of the word.

Some fabrics will flame within the area covered by the igniting flame, but may be considered satisfactory, provided the flame does not continue for an appreciable time after the removal of the igniting flame.

Many treated fabrics will not flame, either during the time of exposure to the igniting flame, or after its removal and thus satisfactorily serve their purpose.

Charring of the material during exposure to the igniting flame is not important from the preventative point of view, since the material has served its purpose, if it has not contributed to the spread of flame.

Glow or Incandescence Important

The question of glow or incandescence is of more importance. At a meeting at the Testing Laboratories of Columbia University, which included representatives of the National and New York Boards of Fire Underwriters, the World's Fair, the New York Fire and Building Departments, members of the Testing Laboratories, and other interested parties, it was the consensus of opinion that glow in the charred area would not ignite any combustible. A flame which would cause a flameproof fabric to glow would have ignited any proximate combustible material. Also, the

glow of several samples, while igniting matches, was not of sufficiently high temperature to ignite paper or untreated linen damask.

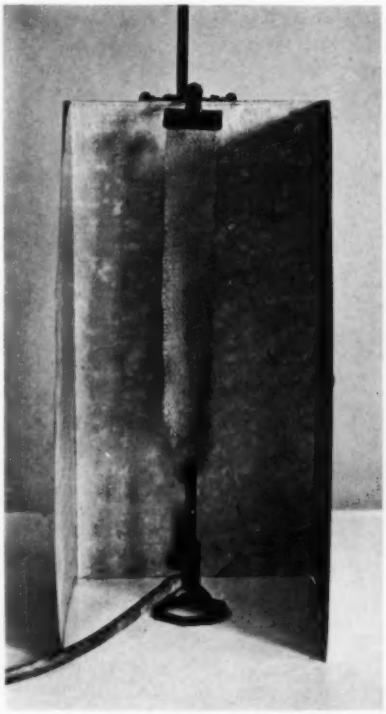
It may be recalled that "flameless combustion" or glow, which is invisible to the eye, has been shown to be a factor in tests on heavier combustible materials. In the case of fabrics, this factor appears to be inconsiderable, by virtue of the fact that the porous nature of fabrics in general will not allow any invisible glow. Any tendency of the fabric to glow is made known immediately, inasmuch as the glow is visible to the eye. If this visibility is doubtful, as might be the case in a fabric colored similar to the red-orange of glowing charcoal, by simply feeling the specimen, its heat will verify the observation. It appears, therefore, that if the glow was not progressive, that is, did not continue outside the charred area, it could be disregarded, despite its duration.

Testing Durability of Treatment

The Building and Fire Departments of New York City make regular inspection of treated fabrics only once a year. In the case of the World's Fair buildings, these fabrics would be tested before being used and would then be assumed to retain their flameproof qualities for one year. If, however, a fabric is treated in such manner that the fire retardents are merely present on the outer surface, where they may be brushed off in handling, blown or dusted off by moderate air currents present in the interiors of buildings, they may lose their flameproof qualities at any time under different circumstances, and may not, therefore, remain effective for a period of one year. For this reason it was felt that the fabrics should be finished, that is, the chemicals should be set or fixed before they are considered for testing; and that they should, even though finished, be subjected to a test to determine the permanence or durability of treatment, before making the flame tests. The following permanence or durability test was, therefore, developed:

A simple wind tunnel was designed, using a fan and a paper cone. In this tunnel the test specimens were exposed for five minutes, with the fan operating at a speed approximating 700 lineal feet per minute (eight miles per hour) through a seven-inch opening, as measured by a suitable anemometer. The specimens were suspended, one at a time, on a horizontal wire two inches above the center of the opening and whipped as a flag would be in a stiff breeze. Five minutes, with the air moving at this intensity, was considered sufficient time to whip the salts out of poorly treated fabrics which had no penetration or fixation.

The adoption of a five-minute period in the air stream was purely arbitrary. Experience in these tests shows that a shorter period at the same air-flow might give the same agitation to be expected over the period of a year in actual practice.



Assembly Used for Fire Tests

However, it is certain that the five-minute period, while it may present greater difficulties to specimens, includes most possibilities and allows for a safety factor covering unusual applications. From several wind tunnel tests carried to ten and even 15-minute periods, it becomes more apparent that some flame-retarding agents are relatively unaffected, there being only a slight loss of weight between the five and 15-minute periods. This loss is probably moisture, as borne out by the subsequent flame tests. Specimens failing the five-minute test have an inherent weakness in that there is no fixation. This limitation has been commercially overcome so that there is no excuse for the use of such fabrics while they are known to be failing in this respect.

Tests on many specimens showed that this conditioning, or artificial weathering, actually threw off some of the salt, especially in the borax-boric acid mixtures. When subsequently tested with the whipped end exposed to the flame these samples failed, and in some cases were entirely consumed. When the specimens were reversed, and the unwhipped ends exposed to the flame, better flame resistance was shown, especially in the height of the char. The flame resistance in such cases was comparable to that shown by specimens which had not been given a permanence test in the wind tunnel. Similar results, in a lesser degree, were obtained with the commercially prepared chemical mixture. The treated fabrics, which were obtained finished and ready for test, apparently lost mostly moisture in the whipping test, as evidenced by low weight changes. These samples later passed the flame test successfully, showing marked resistance to fire.

Well-treated fabrics, therefore, passed this permanence test with facility, while inferior products failed and were eliminated at once.

Flame Tests

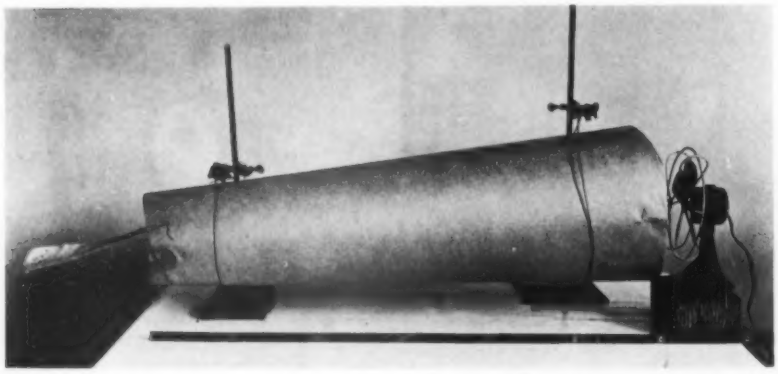
Before entering into the actual flame testing of fabrics, a study was made of the work done on the subject, both in this country and abroad. It was recognized that the testing methods must be simple and effective, and inexpensive enough to create no hardship on the producer or the consumer. All available testing methods were, therefore, reviewed in the search for a simple test to meet the requirements of practical usage.

The testing method finally adopted was taken from the proposed specification of the National Bureau of Standards. Test specimens two inches wide and 12½ inches long were cut from at least three different sections of the sample to assure a representative test of the fabric. These were numbered at one end, partly for identification of the sample and partly to differentiate the whipped and unwhipped ends of the specimens in the test to determine the permanence of treatment as before described.

To obviate any difference in moisture content, and thus provide a fair comparison, the samples, or specimens, were dried for 24 hours immediately preceding the flame test in a room, having an average temperature of 70° F. and an average humidity of 40 per cent. This method of approximating an average moisture content for all specimens was

adopted after oven drying had proven impractical, because of the rapid moisture assimilation of fabric and the possible instability of certain treatments in the drying oven, where prevailing conditions are abnormal to those encountered in the general use of the fabric. Moisture determinations of the fabrics were considered too technical for rapid testing practice. Some drying is accomplished in the conditioning tests, as shown by weight losses in untreated samples, where only moisture could be thrown off. To retain this dry condition, the specimens are placed in a closed, dry container immediately after the conditioning, and thus kept until used in the flame test.

The apparatus used in the flame test is essentially the same as used by the National Bureau of Standards. A Bunsen burner and ring stand, with an adjustable clamp, are enclosed in a metal shield 10 inches square and 20 inches high to protect the flame from drafts. The front of the shield is left open, as the time of exposure of the specimen to the flame is not sufficient for the operation of a sliding door, and the tendency for the heated shield to set up a draft by acting as a chimney, is thus eliminated.



Wind Tunnel for Permanency Test

The Bunsen burner used has a tube of ⅜-inch inside diameter. With the air supply completely shut off, the burner is adjusted to give a luminous flame 1½ inches long. By specifying this certain flame, a nearly constant temperature can be maintained without the use of a pyrometer.

Proper Temperature for the Igniting Flame

As there was a question concerning the proper temperature for the igniting flame, tests on treated fabrics were run with the burner giving a blue gas flame of 1,800° F. Even in this flame specimens successful in the comparatively low temperature yellow flame contributed nothing to combustion. It is the consensus of opinion that most fires in which fabrics have a part are at low temperature, and the ignition point of most fabrics is well below the temperature of a luminous yellow gas flame.

The test specimen is suspended vertically with ½-inch of the numbered end in the clamp and 12 inches of length exposed to the flame. By adjusting the clamp on the ring stand, the lower end of the specimen is set ¾-inch above the Bunsen burner. Thus, when the burner is set under the specimen in the shield, ¾-inch of the fabric is in the flame. The flame is applied for 12 seconds, then withdrawn and the behavior of the specimen noted.

Tests on Representative Types of Fabrics

To make the study thoroughly comprehensive, tests were made not only on the three available types of treatment mentioned early in this report, but also on a large number of representative types of fabrics of various weights, namely, rayon, cotton, linen, silk, wool, and combinations of these, differing in use from curtain to upholstery materials. To set the limits of the various reactions of specimens to the igniting flame, these fabrics were run through the entire testing procedure.

Certain rayons and light cottons were found to be highly retentive of any salt used as a fire retardant, because of their porous weave. Velvets, on the other hand, have a nap which, if agitated, loses salt readily. Despite these differences in texture, however, it is possible to obtain equally successful flameproof treatments. The only material which could not be rendered flameproof by either the commercial mixture or the laboratory mixture was a type of synthetic silk which had been "filled" with a substance similar to airplane dope. This particular "filler" prevented absorption of either fire-retardant salt used in the laboratory treatments. It is conceivable that the commercial treatment might be successful with this material, but this was not tried.

Analysis of Flame Test Results

An analysis of the results of the flame tests shows that the major difference between light and heavy materials, comparing the results of all the flame tests, is the tendency of the former to char over a greater area. However, since charred area is considered a resultant and not a factor in flame spread, no reason was found for varying the flashing, flame duration, or glow requirements according to the weight of the material. Heavy materials, especially those having a nap, also tend to glow longer, but since this glow is confined to the charred area, it may be overlooked.

Flashing occurred in less than one per cent of the specimens. Specimens which failed in this respect were light muslins which had been treated with the borax-boric acid mixture and then subjected to the conditioning test. According to the definition of flameproof, any specimen which flashed was considered a failure.

Since any appreciable continuation of flame after the removal of the igniting agent is also considered failing, a limit of three seconds was set for this reaction. All commercially treated fabrics met this test satisfactorily, as did the majority of the specimens treated with the commercially prepared salt. Incidentally, a limit of less than three seconds could not be noted with any degree of accuracy. The laboratory mixture, that is, the borax-boric acid mixture, failed to meet this limitation in a large number of cases. Apparently this treatment, while successful where permanence is not a factor, should be limited to cases where less than one year of flameproof protection is required. The trouble does not appear to be in the salt, as shown by research conducted by the British Fabrics Coordinating Committee, but in the method of setting or fixing the salt in the fabric.

The test specimens, which passed the flashing and duration of flame re-

quirements successfully, also passed the glow requirement, averaging well under 20 seconds of glow on the edge of the charred area. This figure thus appeared to be within the range of a well-treated fabric, but not sufficiently high to be unduly lenient.

The certification and approval, marking, and costs of tests are in accordance with the requirements and the general practice of the New York Building Department and the Testing Laboratories of Columbia University.

Following are the recommended requirements for fire tests of flameproof fabrics in condensed form:

Recommended Requirements for Fire Tests of Flameproofed Fabrics

Scope

These requirements apply to fabrics used for decorative or other purposes on the inside of buildings or other structures.

General Requirements

The fabric shall be finished after the flameproofing treatment.

Flameproofing Properties

The flameproof fabric, when subjected to the test described in Section 9, shall meet the following requirements as to fire-retardant properties:

(b) Flashing—No flashing shall occur at any time on the length of the test specimen. A flashing due to fuzz or bad edges is to be disregarded.

(b) Duration of Flame—The average continuation of flaming shall not exceed three seconds.

(c) Duration of Glow—The average continuation of glow at the edge of the charred area shall not exceed an additional 20 seconds after the cessation of flaming. Glow confined to the charred area is to be disregarded.

Sampling

Samples for test shall be selected by and tested under the supervision of the authority having jurisdiction. The selection shall, at its option, be at the point of production or the place of use. Samples of each variety of cloth and every kind of treatment shall be selected for testing. The number of samples required shall be discretionary with the testing authority, according to the yardage submitted for approval.

Test Specimens

Specimens for test shall be two inches wide and 12½ inches long, and shall be numbered on one end. Test specimens shall be carefully cut from at least three different places in the sample to provide three test specimens from each sample for testing.

Conditioning of Test Specimens

The test samples or test specimens shall be dried for 24 hours in a room of average temperature of 70° F., with an average humidity of 40.

Test for Permanence of Chemicals

Test specimens shall be suspended by folding and pinning ½-inch of the numbered end over a horizontal 8-gage wire placed two inches above the center of a seven-inch opening in a wind tunnel having a wind velocity of 700 lineal feet, plus or minus 50 feet, per minute as measured by a suitable anemometer on a line with the wire. In this position the test specimen shall be whipped for five minutes. Immediately upon conclusion of this test the specimen shall be placed in a closed, dry container until required for the flame test.

Apparatus for Flame Test

The apparatus required consists of a ring stand 20 inches high, with an adjustable clamp, housed in a metal shield 10 inches square and 20 inches high, open in front and at both ends, and a Bunsen or Tirrill gas burner, which has a tube of ⅜-inch inside diameter.

Flame Test

A whipped test specimen shall be taken from the closed container required in Section on Test for Permanence of Chemicals and suspended vertically with ½-inch of the numbered end in a clip held in a clamp on the ring stand, so that the test specimen shall hang vertically within and near the center of the metal shield required in Section 8. The lower end of the test specimen shall be ¾-inch above the top of the gas burner, on which the air supply is shut off completely and adjusted to give a luminous flame 1½ inches long. The flame is applied for 12 seconds, then withdrawn. The result of the test for duration of flame and duration of glow of the three test specimens shall each be averaged and recorded. Flashing, if any, shall be recorded.

Certification and Approval

Certification of test shall be supplied from an approved laboratory. Approval for fabrics used in the interior of buildings shall be effective for no more than one year, at which time a re-test shall be made, or the fabric shall be retreated and re-tested. The right is reserved to demand check tests at any time, and material found not to conform to these requirements must be removed and replaced with fabrics that will fully conform to the requirements of Section 3.

Marking

Fabrics that have been approved shall be marked with a suitable rubber stamp, or other device, showing date of approval by the authority granting the approval.

Cost of Tests

The required tests shall be at the expense of the owner or contractor.

Ex-Chief Saunders Dead

Harvey W. Saunders, 79 years old, former Chief of Brattleboro, Vt., died in his home following several years of failing health.

He was born in Jamaica, March 22, 1860, and when 24 years old, moved to Brattleboro, and for a time lived in Greenfield, Mass. He returned to Brattleboro in 1887. Mr. Saunders worked his way up in the department and was elected Chief in 1901. He held that office for most of the time up to 1916, when he retired.

Davis-Gill Feud Ends

In the presence of James H. Malone, the new Director of Public Relations, Philadelphia, Pa., Chief Ross B. Davis shook hands with Battalion Chief Charles A. Gill, and ended the differences which have been experienced for three years.

Director Malone said that charges and counter charges brought by Simmler against Gill, and Gill against Simmler, and Davis against Gill, would be dropped.

Chief Davis was given supreme command of the department, and Battalion Chief Gill was assigned to duty in the office.

"Accidents for Sale"

Some Volunteer Fire Companies in communities adjacent to Baltimore go into the business of selling fireworks to the public, including those residing in

Who Wants to Buy an Accident?

Baltimore, just prior to the Fourth of July. Revenue is their excuse for this business venture.

Under the above caption the highly effective cartoon herewith appeared on July 3 in the Baltimore (Md.) Evening Sun. It is the work of cartoonist Jack Lambert.

Rates Cut in Memphis, Tenn.

As a result of the fire prevention work that has been conducted by Chief Irby M. Klinck, the Tennessee Inspection Bureau has notified Memphis that fire insurance rates would be reduced and the saving in premiums would be about $100,000 annually.

Memphis won the national award for fire prevention work in 1937 and again in 1938.

Memphis is the only Class 2 insurance rate city in the state, the best rating possible.

Last fall, the March of Time pictured a story of the Memphis Fire Department, which was shown in 8,500 theatres throughout the country.

EXTINGUISHING METHODS USED ON AUTOMOBILE FIRES

Survey Covering 426 Cities Shows Practices in Handling Automobile Fires

A SURVEY recently completed by FIRE ENGINEERING among 426 cities, ranging in population from 5,000 to 6,930,000, brought forth some interesting data on extinguishers used in handling automobile fires and the percentage of alarms in different cities which were for this class of fires.

The 426 cities included reported a total of 229,597 alarms (false alarms not included) during 1938, of which 27,249 were for automobile fires. Thus the car fires represented 11.53 per cent of the total number of fires fought.

Water, including fire streams, fog, and applied by containers, was used at car fires in 310 cities, or in 72.7 per cent of those reporting.

Soda and acid extinguishers were employed on car fires in 167 cities, or in 39.2 per cent of those reporting.

Foam extinguishers were used in 250 cities, or 58.6 per cent.

Carbon tetrachloride extinguishers were used in 206 cities, or 46 per cent.

Carbon dioxide extinguishers were used in 80 cities, or 18.5 per cent.

In the group of cities over 500,000 population, automobile fires represented 13.5 per cent of all fires; in cities between 200,000 and 500,000 population, 11.4 per cent; in cities between 100,000 and 200,000 population, 9.9 per cent; in cities from 30,000 to 100,000 population, 11.9 per cent; in cities from 10,000 to 30,000 population, 10.7 per cent; in cities of less than 10,000, 9.6 per cent.

The table herewith gives a summary of the information received, classified in population groups of the cities reporting.

Population Group	No. of Cities Included	No. of Alarms	Car Fires	% Car Fires	Number and Percentage of Cities Using Means of Extinguishment of Car Fires — Water (and Fog) %	Soda and Acid %	Foam %	CTC %	CO_2 %
Over 500,000....	8	78,686	10,661	13.5	5-62.5	5-62.5	5-62.5	5-62.5	4-50.
100,000-200,000...	19	25,186	2,501	9.9	15-79.	10-52.5	11-58.	6-31.6	7-36.8
30,000-100,000....	75	34,795	4,163	11.9	68-90.6	35-46.7	56-74.7	32-42.7	20-26.7
10,000-30,000.....	160	31,475	3,374	10.7	115-72	65-40.6	97-60.6	93-58	30-18.7
Less than 10,000.	141	12,861	1,235	9.6	95-67.4	44-31.2	74-52.5	70-49.6	16-11.3

The above figures do not include those cities making incomplete reports.
The percentages given under the heading "Means of Extinguishment of Car Fires" are the percentage of cities reporting which used the type of extinguisher given at the top of the column.

Bridgeport to Entertain Connecticut Firemen

Firemen from all parts of Connecticut will gather at Bridgeport on Friday and Saturday, August 18 and 19 to attend the 56th annual convention of the Connecticut State Firemen's Association, which will be held at Pleasure Beach, a shore resort located at the eastern end of the city.

A mammoth field day, under the auspices of the Bridgeport Fire Department, will be staged in conjunction with the convention. On Saturday afternoon, August 19, the Convention will close with one of the largest parades in the history of the state association. Twenty-two cups will be awarded as prizes, with a feature prize of a Homelite floodlighting outfit for the company winning the most number of points in all events. Only companies hailing from Connecticut are eligible to compete for the Homelite award.

Among the judges of the parade will be two women. They are Mrs. Howard S. Challenger, Bridgeport, and Mrs. Thomas Carroll, Fairfield. It will be the first time that members of the fair sex have been selected as judges of a firemen's parade in Connecticut.

The convention meeting will be opened by President John E. Graham, Waterbury, who will turn the gavel over to Chief Cornelius J. Carrigan, Terryville, upon the latter's elevation from his present post of Vice-President to President. There will be no contest for this office. The State Vice-President, Secretary and Treasurer will be chosen by the delegates.

Hon. Raymond E. Baldwin, Governor of Connecticut, State Senator Albert C. Coles and Mayor Jasper McLevy, Bridgeport, will be among the speakers at the first day's meeting.

THOMAS F. MAGNER.

Chief Pence Issues Report

The work and accomplishments of the Stillwater, Okla., Fire Department are contained in the annual report recently made by Chief J. Ray Pence. The report gives a very complete analysis of the fires and the work of the department and men in fighting these blazes. It also contains an audit of the equipment of the department.

Firemen Overcome by Chlorine

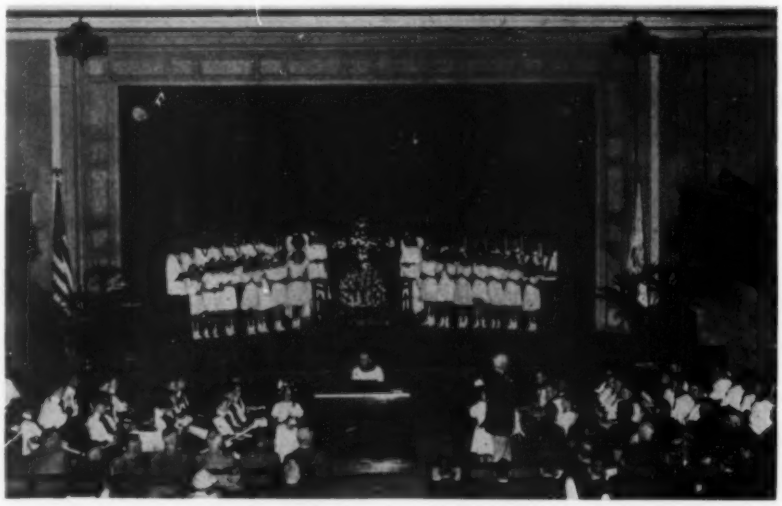
Chief Drouin, Lewiston, Me., while testing a piece of apparatus, noticed dark smoke coming from a building. Upon arrival at the spot, he discovered a saw mill on fire, involving 75 cords of birch slabs. An alarm was rung in at 5:08, second at 5:12 and call made to Auburn for help at 5:15.

In addition to the saw mill, two freight sheds of the Maine Central Railroad Company, about 25 feet distant, had become involved, and 75 feet distant, a wooden shed with shingle roof, used to store 30,000 gallons of fuel oil and 1,200 tons of soft coal, had ignited from the exposure.

Three crews, each with a line of hose, were directed to cover this building to protect the oil and coal. On the railroad platform, near this building, were eight tanks of liquid chlorine. Heat from the burning buildings melted the lead safety plugs in three of the tanks, allowing the gas to escape, affecting 20 firemen. Fifteen of them were overcome with the gas fumes and were hospitalized.

Capt. Verderber, wearing a gas mask, succeeded in placing wooden plugs in the tanks where the gas was escaping. A crew of men, on the windward side of the tanks, kept them cool with a line of hose and further danger was eliminated.

J. W. RANDLETTE.



At the Memorial Services Held by the New England Association of Fire Chiefs, Providence, R. I.

The annual memorial services of the New England Association of Fire Chiefs was held in the Elks' Home at Providence, R. I., during the annual convention. Participating in the services were vested choirs from Roman Catholic and Episcopal Churches, and a number of young girls. The priest gave the memorial address, and the Episcopal chaplain, the benediction.

DRILL TEAM PROVES VALUABLE TO SAN FRANCISCO DEPARTMENT

Has Helped to Win Public Support for Department; Team Organized Originally for Annual Dance

CHARLES J. BRENNAN, Chief of the San Francisco Fire Department, has long been an advocate of intra-departmental activities, contending that this makes a more efficient fireman. The broad viewpoint has naturally been fostered by the department members and the latest idea to manifest itself along these lines is the Special Drill and Marching Unit, made up entirely of men in the uniform force. Incidentally, none of the men has been in the department more than five years, and the average age is 26 years.

Chief Charles J. Bennan Congratulates Lieut. Roy Mow

In the background are some of the drill team, and in the foreground, a few of the cups won by the team.

Believed to be the only one of its kind in the United States, it has proven to be a great asset in bringing the Fire Department to a place of greater esteem in the eyes of the citizens of San Francisco. The effect upon the mind of the public attained by the appearance of the unit in the parades has been very complimentary to the department, for in the discipline, the instant understanding of orders and the precision of their execution, the good people of San Francisco see a reflection of these invaluable attributes of the department in its performance at fires.

Organized primarily to function at only one occasion, the Fireman's Ball, it was so well received that it has been retained by popular demand. How it came into existence is a story in itself.

Prior to the 1938 Annual Ball, the Entertainment Committee, endeavoring to add a feature to the spectacular fire-scene, hit upon the idea of a fancy drill and marching unit. Chief Brennan, a veteran of the Spanish-American war, who still retains his love for the Army, gave the order to go ahead. All this happened a scant five weeks before the ball. Lieut. Roy Mow was selected for the job of organization and he did splendid work. Days of tedious practice and hard work followed. Came the night of the ball and the team was still of an unknown quality, with plenty of skeptics. However, the 20,000 people who jammed the Civic Auditorium that evening will attest to the precision and skill of the unit. At the conclusion of the exhibition, the audience was on its feet and the applause literally "tore down the rafters."

Many Appearances

Since that first appearance, the team has appeared in numerous parades, competitions and other civic functions. In all of these, they have been awarded first prize. In the Independence Day Parade, it was voted the outstanding marching unit. Chief Brennan has received letters and comments from people in every walk of life. Major General George S. Simmonds, U. S. Army, was impressed to the extent that he wrote:

"It is a real pleasure to tell you that the marching of your men, as well as their appearance, was splendid. . . . I have rarely seen a better performance by uniformed marching units.

"Their bearing and discipline and their very straight lines reflects great credit on the personnel involved and on those responsible for their training and discipline."

Another turnout caused Major General C. H. Lyman, U. S. Marine Corps, to express his compliments, describing the team as being able to perform "intricate movements which would have done credit to any organization."

Despite the enviable reputation that has been established, the team continues to practice weekly. Plans are being made to again participate in this year's Annual Ball which will be held during the International Convention of Fire Chiefs. Here it will be possible to demonstrate to the visiting Chiefs that the San Francisco Fire Department can accomplish other results than extinguishment of fires. They hope that some visiting Chief will issue a challenge for a competitive drill, for, according to the words of its Commander, the team invites national competition.

Flood Problem in Fire Prevention

Within recent years, a number of communities have experienced severe floods, many surpassing all previous flood records. Realizing that floods have a relationship to fire prevention and protection, a number of organizations have cooperated in the preparation of a 115-page illustrated book on "The Flood Problem in Fire Prevention and Protection," which has been published and is being distributed free by the National Board of Fire Underwriters, 85 John Street, New York, N. Y.

Eugene F. Gallagher, of the Ohio inspection Bureau, was Chairman of the special Committee of the Advisory Engineering Council of the Committee on Fire Prevention and Engineering Standards. Other organizations that cooperated include the U. S. Army Engineers, the U. S. Weather Bureau, the Cincinnati Gas and Electric Company, and the officials of many cities stricken by the floods.

The book is divided into four main sections. The first part gives a history of floods and general weather data. Part two is on "Meeting the Flood Situation," and covers zoning and emergency codes, the work of the various city departments during floods, and the responsibilities of the individual. The third section is "Rehabilitation," and the fourth on "Services of Organizations."

Chief H. B. Wells Honored

While attending the Southeastern Division meeting of the I. A. F. C., at Durham, N. C., Chief H. B. Wells of Newberry, S. C., was presented with a double sided watch charm by members of his department. One side of the charm was to mark his fifty years of service as a volunteer fireman in Newberry and the other, to commemorate his term as President of the Southeastern Association.

Newberry, a town of 8,000 persons, has all volunteer firemen with the exception of three paid day drivers, and has two 750-gallon pumpers and a service truck.

Chief H. B. Wells

Before becoming an active volunteer, the man must attend a training course conducted locally, and then must serve a probationary period of thirty days.

Chief Wells joined the department in 1889, when he was sixteen years old.

Chief Neal, Bloomington, Resigns

Rolla Neal, Chief of Fire Department, Bloomington, Ill., resigned after serving nearly 25 years in the department, where he was Chief for 16 years.

At the present time, Elmo Waters is Acting Chief.

Correspondence

A Story About Chief Kellogg

To the Editor:

A few days ago, an old fire fan called to talk over old times, and he left me a few copies of FIRE ENGINEERING, which I have enjoyed reading. The one item which I enjoyed most was the one concerning my old friend George Kellogg, of Sioux City, Ia.

It called to mind a most interesting experience I had with that city nearly 20 years ago. I have forgotten the date, but some time in the early part of the year, their Fire Commissioner called on me at my office, and after a short visit, he made known the purpose of his call.

He stated that among the officials of their city, there was a general feeling that the time had come when they should retire their Fire Chief on account of his age. He asked me if I had a man whom I could recommend for the position.

I told them that I had several men who I considered well qualified, but none of them would care to make such a change. I said to him, "Is it possible in a city of that size, you are unable to choose a man from the personnel of the department who is qualified to fill the position of Chief?" In an unguarded moment, I made the remark that I believed if I were there I could pick the right man.

A few days later I received a letter from their Mayor reminding me of my remark, and asking me if I would come down and assist them in selecting a Chief. Finding that my bluff had been called, I felt it was up to me to make good. The next day I took a train for Sioux Sity, where I met the Mayor and the Commissioner.

During my stay there I met and talked with nearly every member of their department, and before leaving for home I had dinner with the Mayor and the Commissioner, at which time I made my verbal report. I said to them that the best advice I could give them would be to keep the Chief they had, as his experience and his integrity are worth more to the city than would be the activities of any young man. I am indeed pleased to know that my old friend George is still going strong.

C. W. RINGER,
1920 West 21st Street,
Minneapolis, Minn.

Fire Entrance Frame

To the Editor:

I am sending you this for what it is worth in answer to your quest for ideas.

Modern building fronts and modernizing old ones have recently brought about a serious situation in our city and practically every city of the country in the way of gaining entrance to the basement in case of fire.

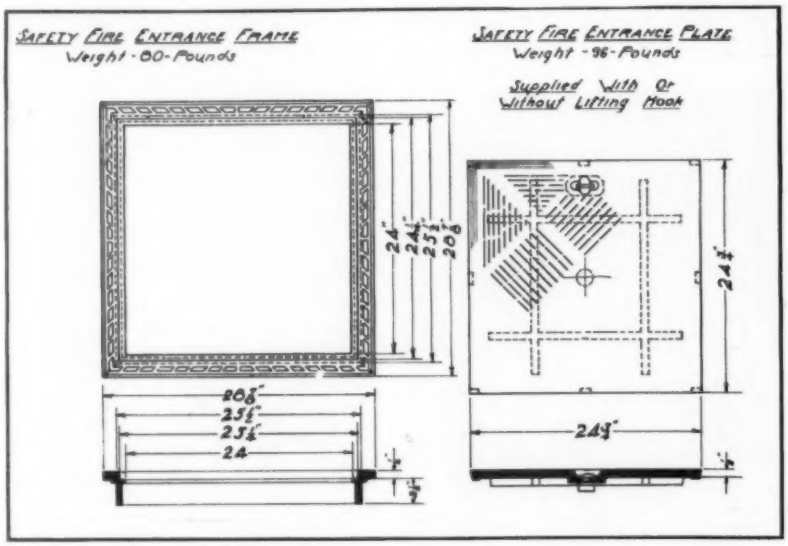
In our city we have hit upon a rather neat and easy way to overcome this problem and still not disrupt the plans of the architect, or place the property owner to an unwarranted expense.

We place close to the building, gray iron plates and frames, with a 24-inch clear opening. There is also an opening through the wall below the sidewalk so that men can enter with masks or use cellar pipes through this opening from the outside. Thus, by opening the rear door or windows, you establish a cross draft ventilation and every fireman knows how important this is.

In case there is need to enter the basement, a few blows with a heavy mallet breaks the plate allowing easy access. Should the property owner desire to lock the plate to prevent pilfering, a ring bolt is threaded into the plate and a cross bar is inserted through the ring bolt and across the opening.

The Winona Machine & Foundry Company developed plans and details. The plate and frame is economical, in that it costs only $9 with the ring bolt, and is strong enough to care for the heaviest traffic usually traveling over a sidewalk.

Yours very truly,
H. G. PUTNAM,
Chief, Winona, Minn.



Details of Safety Fire Entrance Frame

Gas From Wood Fires

To the Editor:

The fire fighting fraternity should feel greatly indebted to Chief W. E. Lott, Jr., of the Mineola, Tex., Fire Department for his article on this same subject, appearing in the June issue of FIRE ENGINEERING. We believe this subject should be brought out into the spot-light for a round table discussion through the pages of this magazine.

In a letter since received from Chief Lott, he states that this article was not written to discourage the use of nozzles of this type for, he says, "I am a firm believer in their effectiveness." Then he makes himself very clear by saying that what he had in mind was to bring into the open all possible information available concerning them, in order that we might receive the greatest advantages from their use.

Our engineers, including Battalion Chief Glenn G. Griswold, the inventor of the Griswold Fognozl, have been studying this subject since 1925. These engineers, who include hydraulic, electrical and fire engineers, as well as Chief Griswold, who is one of the outstanding engineers on oil fires in the country, have delved into this subject so thoroughly that we have quite a library of pertinent information. One of the greatest tendencies in all instruction on fire fighting is to overlook certain situations that the informant did not take into consideration, because one never knows exactly what fire will do in all cases.

Chief Lott also states that "with my limited experience, I cannot see that the fog pattern should make any difference." This suggests the basis for fighting fire with broken water and while the pattern itself has not direct bearing, the type of broken water does have a bearing and this in turn affects the pattern.

Fighting fire with broken water is not new. This is another fallacy. Almost since the hose was invented, which is over a hundred years ago, fires have been extinguished with broken water with planned deliberation. The old slogan, "hit the ceiling," was for the purpose of directing a straight stream against the ceiling or some obstruction to break it up and absorb more heat. The socalled "lumber nozzle" or spreader nozzle breaks up water. An ordinary garden hose nozzle breaks up water and does a good job of fire fighting under pressure.

Combustible Liquids and Solids Do Not Burn

It is human nature to accept many statements through habit and custom conveys understanding for all practical purposes, but the scientist and analyst explodes some of our pet ideas. When we say, "It's raining," just what do we mean by "IT?" The chemist proves to us that liquids and solids, in themselves, do not burn. They must produce a gas by vaporization, or they must be heated to the point where they produce a vapor or gas. This gas must be properly mixed with air (oxygen) and it is the

gas-vapor-air mixture that burns. The residue is smoke (carbon) or a decomposition (ash) from which the gas has been liberated. Unless the material is heated to the flash point and comes in contact with a spark at a time when it is properly mixed with air, it will not burn. If the mixture is too rich or too lean, it will not burn. Therefore, the chemist tells us that all fires are vapor fires.

Broken water can be divided into innumerable types from a light fog to rain, or sheets of water over a falls. It is the outside surface of water that absorbs heat. The amount of heat (B.T.U.'s) absorbed depends upon the amount of water surface and the length of time it is exposed to heat. If the water is not fine enough, like spray or rain, it drops through the heat and its time-exposure is reduced. The proper broken water for the purpose under discussion consists of globules that are large enough to absorb the maximum amount of heat for particles which can be partially suspended in the air and at the same time have all these globules of as nearly a uniform size as possible and uniformly spaced one from another, so that they will not re-unite and form drops or masses of water and also so that they will form a homogeneous arrangement of liquid zone—a milky-way, if you please.

Cooling Results

Firemen have also known for a long time that if, in a heated, smoke-filled room, they hold their face close to the nozzle of a straight stream they can breathe better. Our engineers explain this by saying that air expands and contracts with changes in temperature. Cold air is more condensed and, therefore, has more oxygen in a smaller space. The lungs can function better on cool air than on hot expanded air. By breathing the cool air at the nozzle, conditions are more livable. Now if you have a fog pattern that cools a wide area of air without open spaces, the livability of the zone is increased. If all firemen knew these facts, it is our opinion they could more safely fight fires with broken water.

The Los Angeles County Fire Department has been using fog nozzles for about ten years and at no time have they had an instance where firemen were overcome with fumes because of the use of this nozzle.

Knock the fire down, absorb the heat, then keep the vapors diluted with the most efficient means at your disposal and follow through with a "cold crew" to overhaul the fire. Life is too precious to indulge in anything but the best devices.

R. B. LARTER,
Vice-President,
The Fog Nozzle Company,
Los Angeles, Cal.

Ambulance Operated by Firemen

To the Editor:

For some years Fon du Lac, Wis., has operated the city ambulance out of the Police Department.

Two years ago the Legislature enacted a law placing policemen on eight-hour shifts.

The city did not provide any more men and it was necessary to send all policemen out on patrol, motor cycle or squad car duty. This left only a desk sargeant at the station, making it necessary to call in men in case of an ambulance call.

I have taken over the ambulance and it will now be operated as an auxiliary, or emergency rig out of the Fire Department.

Additional equipment, now carried on the service truck (a "quad"), including flood lights, inhalator, oxygen mask, etc., will also be carried on the ambulance. A radio receiver will be installed, tuned to the tri-county station now used by police. I hope through the operation of this piece of apparatus to give service which will be worthy of consideration of a larger and better rescue unit and to have additional men in the near future. I believe this to be an opportunity to sell the Fire Department through better service. Sincerely.

GEORGE L. SMITHERS,
Chief, Fire Department,
Fond du Lac, Wis.

Ignition of Oily Mops

To the Editor:

In regards to ignition of oily mops in the Question and Answers page of the June issue, I believe you have left some doubt in the questioner's mind.

We have had two such fires in recent years, one identical with the one stated by J. O. C., and another where the mop caught fire as the tar kettle was being pulled to the warehouse following a road tarring job. The mop was clamped to the side of the rig carrying the kettle.

In either case no vegetable or animal oil was ever used on the mops. It was also very mysterious and after careful study and tests, the Second Assistant Chief came to the conclusion that:

"After the use of the mops in hot tar, the air striking the mop cooled the outer surface and formed a crust which retained the heat inside the mop and eventually built up such tremendous heat that fire resulted. The mop on the roof would take more time to ignite, because it was found that the mop being transported received its crust sooner because of the rush of air."

Sparks from a locomotive setting fire to tar is highly improbable, even if the tar was hot, because the sparks were cooled some. Even if the sparks were fully alive and did fall on the tar, it would be the same as putting a lighted match quickly into a pan of gasoline which would be extinguished without causing a fire.

Yours truly,
LESLIE J. HOERTSCH,
Kenosha, Wis., Fire Department.

More Facts About Mops

To the Editor:

In the June issue we find under Questions and Answers a letter signed by J. O. C. in which the question is asked regarding a fire which was discovered on the roof of a building and note that they assumed that the fire was started from a passing locomotive. This is not true.

It so happens that the writer spent many years in roof contracting where asphaltum, heated, was used in applying the roofing materials.

In applying this material a mop, made with regular mop yarn, was used and when the workmen were through for the day these mops were carefully cooled off by swinging and flopping, otherwise they would build up heat on the inside and after remaining dormant for several hours would burst into flames. This happened a number of times and in one instance caused a very bad fire. All efficient roofers realize this danger, with the result most mops are cooled before leaving the job.

Many bad fires have started from the kettles used for heating either coal tar or asphaltum. Sometimes while the lid is off the kettle, water from rains or other sources may get into the heated tar, or asphaltum, causing same to boil over. Quick thinking will stop such fires if the "kettle man" will replace the cover which smothers the flames. Where such fires are out of control water should never be applied as this causes a spread which was the case in Seattle a number of years ago when one of the docks was burned to the waters edge.

Trusting this may serve to enlighten some of the readers of your valuable magazine from which we get much real information we are,

Very truly yours,
GEO. A. NEEP,
The Neep Equipment Company,
Portland, Ore.

Long Island Has Forest Fire Problem

TO THE EDITOR:

I was pleased to note in your June issue that some attention was given to the forest fire control situation. Here on Long Island, N. Y., we also have the same set of conditions that were described as existing in New England, following the hurricane of last September.

Suffolk County, on Long Island, is still in bad shape. C.C.C. Crews are doing a good job in cleaning up, and other men are working hard to meet the blaze that is sure to come if a dry season continues.

Very truly,
I. S. STIVER,
Forest Ranger, Fire
District N. 11

Ex-Chief Flynn, Great Barrington, Honored

Friends of Chief Daniel W. Flynn, Great Barrington, Mass., arranged a testimonial dinner to mark his retirement from the department, after serving 20 years as Chief. He was presented with an electric clock and a check for $100.

Indiana Chiefs Meet in Terre Haute

Plans are being completed for the 13th annual convention of the Indiana Fire Chiefs' Association which will be held in Terre Haute, September 6 to 8.

Talks will be given by Roy Mottesheard, President, I. A. F. C.; Fred Watkins, State Fire Marshal of West Virginia; Gov. M. Clifford Townsend of Indiana, and others. A round table discussion will be led by Clem Smith, Indiana State Fire Marshal. Convention headquarters will be at the Terre Haute House.

For further information write to Frank L. Orr, P. O. Box 176, Terre Haute, Ind.

NEW FIRE ALARM SYSTEM FOR BEVERLY HILLS, CAL.

Boxes Thoroughly Cover City and System has Latest Devices to Insure Efficiency and Accuracy in Transmission

By Chief L. B. Canfield
Fire Department, Beverly Hills, Cal.

A COMPLETE new fire Alarm System of the latest and most modern type has just been installed in Beverly Hills. The equipment was manufactured and installed by the Gamewell Company and the city received a PWA grant of 45 per cent of the total cost of approximately $100,000. In consideration of this new system, the National Board of Fire Underwriters has allowed a reduction of insurance rates of approximately 16⅔ per cent on residential buildings and contents and up to as much as 22 per cent on mercantile buildings and contents, estimated to result in an annual saving of $18,102, with present buildings.

If the actual cost to the city of $55,000 is amortized over a 20-year period (a very conservative estimate of the life of the system), and allowing $1,000 per year for maintenance, the actual annual cost is approximately $3,750. Subtracting this amount from the annual saving of $18,102, leaves a net balance of $14,352, or a profit of 373 per cent per year. This saving will actually be greater in the future, as additional buildings go up, and insured values increase.

Beverly Hills has an excellent water system and a well trained Fire Department; and the fire alarm system is the one item required to round out this protection and give the city one of the most complete and efficient systems of fire protection in the world.

This alarm system is the latest Gamewell Three-Fold type, and provides for receipt of alarms from boxes, even though the circuits are broken, grounded or short-circuited, or with various combinations of these troubles.

System Entirely Automatic

The system is entirely automatic and requires no operators for complete service.

A total of 121 boxes is included, 34 being mounted on separate ornamental pedestals, 84 on electroliers, and three on telephone poles. The installation of boxes on electroliers makes a very desirable arrangement where the electrolier is in the proper location, as it utilizes the existing pedestal and also provides a light over the box at night. All boxes are equipped with quick-action doors, which require no breaking of glass and allow the alarm to be transmitted in the quickest possible time.

Boxes Thoroughly Cover City

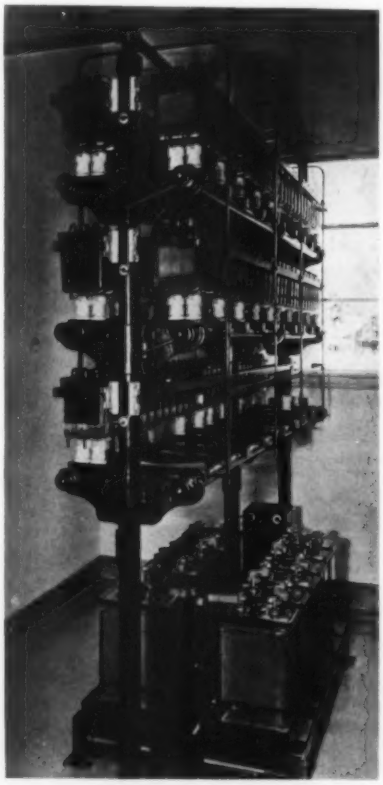
The boxes are located so as to thoroughly cover the city, in accordance with the rules of the National Board of Fire Underwriters. In general, a box can be reached by traveling not over one block in the business district and 1½ to two blocks in residential areas. On Wilshire Boulevard, which is a wide and heavily traveled thoroughfare, the boxes are located every other block, and distributed on both side of the street, so that it is not necessary to cross the street to reach a box within reasonable distance.

The location and number of the boxes is the foundation of the system and great care was taken to determine the minimum number of boxes which would adequately cover the city.

Numbering System for Boxes

The boxes are numbered so that each number indicates the box location. All numbers on Wilshire Boulevard and to the south begin with one, and the second digit denotes the number of blocks south. The dividing line for numbers east and west is Rexford Drive, and all boxes west of Rexford have the last one or two figures odd, and boxes to the east have even numbers. Boxes north of Wilshire Boulevard have the first digit denote the number of blocks north, as far as Sunset and beyond Sunset all boxes have the first digit, No. 9. The same method for designating boxes east and west of Rexford is employed, as explained, for boxes south of Wilshire. Thus box No. 54 is at Carmelita and Foothill, five blocks north of Wilshire and two blocks east of Rexford. The blocks west of Rexford are numbered 2, 4, 6, 8, etc., and blocks west 1, 3, 5, 7, etc. This provides a very simple and practical numbering scheme, which makes it easy to identify and memorize the box location and with a number for each intersection in the city.

A system of running cards has been worked out and installed in each station, showing the location of each box, with a detailed layout of the surrounding area, with each house and building clearly indicated.



Battery Rack and Cells

The battery cells have grooved bases which fit over the tops of ¼-inch thick glass strips, which, in turn, are set in the tops of two-piece porcelain insulators.

Telephone Systems Included

The system is designed so that a portable hand telephone set can be plugged into any fire alarm box and communication obtained with the Central Office, or with any engine house, or with another box. This function is very desirable when testing, or when a company has responded to a fire. Portable telephone sets are carried on each fire truck and enable the Chief or other officers to maintain connection with headquarters, or with each other from any box.

A separate telephone system is also included, with lines to each engine house and the Chief's home for departmental service,

The Central Office equipment is installed in Fire Headquarters in separate rooms provided for this purpose, when the building was erected in 1930. This building is Class A, of the best possible type of construction. An automatic fire door is installed to cut off the alarm rooms in case of fire on the apparatus floor.

Future Installation Provided For

The system includes five box circuits, which, with the three-fold feature, allows 30 boxes to be connected per circuit, or a total of 150 boxes. This provides for future installation of 29 boxes with existing circuits and equipment, to take care of the anticipated growth of the city. Additional box circuit panels can be easily added in the fuure, if conditions should require.

Arrangement of Switchboard Panels

The switchboard panels are of the unit type, dead front so that no live parts are accessible. Rotary flush type switches and meters provide for control and test of all necessary functions. If any switch is left out of normal position, a red light glows continuously until the switch is restored. Automatic repeating facilities of the unit relay type are included on each panel.

There are two common panels for control of the repeating functions and power supply. Each circuit panel has its own

low rate copper oxide type rectifiers, with facilities to charge each battery at high rate from the power panel, as required.

An automatic charging unit is provided for the local battery.

A supervisory pilot light on each panel glows as long as conditions are normal. If the circuit is broken or grounded, this light is extinguished and a trouble bell sounds to call the attention of the operator to the abnormal condition.

This system is at present operating as Class C; but can be easily changed to Class B, whenever conditions require.

Gasoline Engine Driven Generator Provided

The fire alarm circuits are normally energized direct from the local 110 volt, 50 cycle, AC power supply, with individual floating storage batteries to provide service in case of failure of the commercial supply. A gasoline engine driven generator is also installed, with an automatic control, so that it starts immediately upon failure of the AC supply. This generator not only furnishes energy for operation of the fire alarm system; but is connected also to an emergency lighting system in the Fire Department Headquarters and to operate the Police Radio system and lights for the jail in the adjacent City Hall building. A large local battery provides energy for the registers, relays, lights, etc., in the Central Office and for an emergency rotary converter for the three-fold functions, when the commercial AC supply and gasoline engine generator are both out of service.

The batteries are mounted upon metal racks with glass and porcelain insulation and with guards to prevent the cells from being overturned or broken, in case of an earthquake.

Units of Special Operator's Outfit

A special operator's outfit is installed at the Central Office to provide in one centralized location control of the facilities handled by the operator, when one is on duty, including the following units:

1. A motor driven tape register and take-up reel with automatic time and date stamp. The latter includes a synchronous motor driven clock and is designed to automatically correct the date for the respective months without manual attention. The register tape is fed across the front of the panel, so that at least one round of the last signal with the time stamp record is always in view.
2. A manual transmitter, with non-interfering and successive control, with facilities for manually setting up and transmitting one to four rounds of any number from 1 to 9,999, exclusive of zeros.
3. A manual telegraph key, to supplement signals from the transmitter and with a locking device, so that it cannot be accidentally operated.
4. A cord and plug with jacks for each circuit so that the transmitter and key can be connected into any box or future alarm circuit.
5. A series of six push buttons for operating bells and buzzers throughout the building.
6. Switches and pilot lights and buzzer for control and inter-connection of the separate telephone system to the engine houses and boxes. Necessary ringing facilities, condensers, relays, etc., for complete operation of this system. A pilot light is provided for each box circuit and engine house and the Chief's office and residence, with a common buzzer, the light being illuminated and the buzzer sounding when the receiver is removed from the set in the engine houses and when the hand set is plugged into a box and a special call button pressed at the boxes. There is a listen and call key for each circuit and a key to allow inter-communication over either of two separate paths.

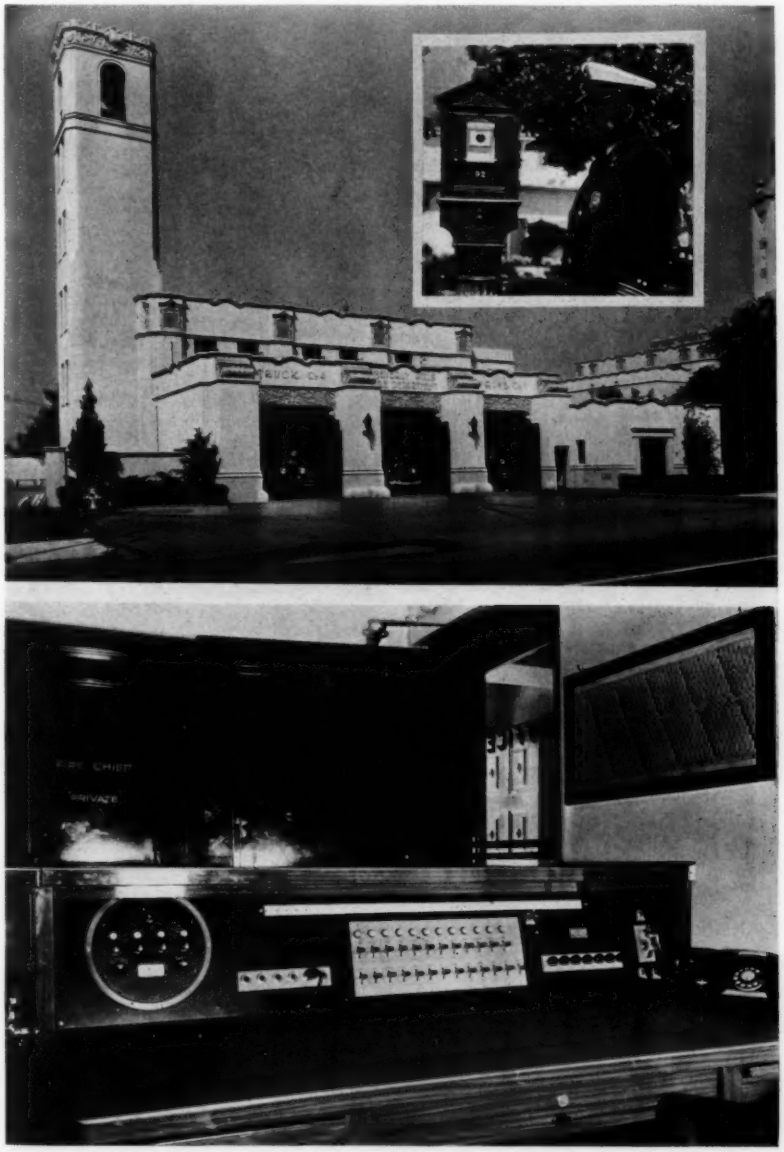
All of the foregoing is installed on a metal panel, finished in black crystal lacquer and mounted in a cabinet over a desk. The cabinet also contains drawers for records and papers. Two tubular lamps are installed at the top of the panel for illumination. The cabinet and desk are finished in grained mahogany to match woodwork in the office, with tan linoleum tops.

The switchboard panels are mounted in metal cabinets finished to match the walls of the room, with a shelf all around, with tan linoleum surface. Special shelves are provided on this cabinet for a recording set for A.D.T. and for a radio receiving set.

The battery and gasoline engine generator are in separate rooms, well ventilated.

Circuits Carefully Safeguarded

The circuits leave the Central Office in underground cables and the positive and negative sides of each circuit run in separate cables and by seperate routes. Each box circuit is laid out, so that, if damage should occur, due to wind storm, earthquake, etc., it can break only one side of the circuit, so that alarms can be received through the Three-Fold feature from boxes on either side of the break. The underground cables include con-



Views of the System at Beverly Hills, Cal.

Upper, Central Fire Station building, which also houses the central fire alarm station. In the insert are Chief L. B. Canfield and the type fire alarm box used. Lower, central station operating room showing the fire alarm operating cabinet with the recording devices mounted within the cabinet. The register tape is drawn across the front by the automatic paper take-up reel.

ductors for a future alarm circuit to each engine house and necessary spares. All underground cable complies with the IAME Specifications with 30 per cent Hevea rubber insulation.

Construction of Circuits

Aerial circuits are constructed with No. 12 B & S gauge copperweld conductors, with triple braid weatherproof insulation for the fire alarm circuits, and No. 14 copperweld twisted pairs, with 30 per cent rubber insulation and a single braid for the telephone circuits. Pin space is available on cross-arms, for the future alarm circuit to the engine houses. Vacuum type lightning arresters and fuses are installed at the junction of aerial and underground conductors of all underground runs of 500 feet or more and for all main line cable.

Approximately 43.5 per cent of all circuits are in underground cable. Nearly 60 miles of circuits are included in both the aerial and underground construction. The underground cables are installed in sherardized steel conduit. Hand holes are provided, so that no cable extends for more than 500 feet without being accessible at a hand hole or terminal.

Recording Registers

In each engine house there is a tape register, with take-up reel, and one or more gongs. There is also an automatic relay for turning on the lights whenever the fire alarm system operates, or the fire telephone rings, with a manual restoring switch. Mounted on the recording set shelf at each house is a compact unit, which provides for telephoning over the box circuit entering the house, the same as from a fire alarm box for emergency service and a telegraph key and switches for grounding either side of the circuit. Lightning arresters and fuses are provided in a sheet metal cabinet for all fire alarm and telephone circuits entering each house.

With all of the above features, we have a fire alarm system which embodies the most modern developments, and is based upon the experiences of fire alarm service throughout the country for many years. The great precautions taken to provide service under all conditions should give us means for communicating in times of great emergency as well as routine service. Over a period of years this increased protection will pay dividends, not only in reduced insurance rates, but in security to the city and safety to life and property which is beyond actual financial measure.

Pension Law for New Hampshire

New Hampshire has enacted a retirement measure by which the state will contribute $20,000 each year and the 285 permanent firemen of the state will match this sum. The money will be used towards pensions for disabled firemen and for widows of fire fighters killed while on duty.

Compulsory retirement at half pay for firemen over 70 will start in 1947, and voluntary retirement at 65 years will start in 1942.

The act will be administered by a board of fire members which will include the Comptroller, State Treasurer, and Commissioner of Insurance.

TENTATIVE PROGRAM FOR THE I. A. F. C. ANNUAL CONFERENCE

Schedule of the 67th Yearly Gathering to be held at San Francisco, California on September 20 to 23

THE tentative program of the 67th annual conference of the International Association of Fire Chiefs, which is to be held at San Francisco on September 20 to 23, is given herewith. The headquarters are to be at the Empire Hotel, and the meetings and exhibits at the Municipal Auditorium.

Wednesday, September 20

Registration 8 a. m. to 9:45 a. m.

Conference called to order at 10 a. m. at Municipal Opera House.

Invocation: Address of Welcome; Response to Address of Welcome; President's Message, by Chief Roy E. Mottesheard, Dearborn, Mich.; Memorial Services; Announcements; Adjournment for lunch.

Afternoon (2 p. m.), at Municipal Auditorium.

Roll Call: Adoption of minutes of preceding meeting; Appointment of Committees; Report of Secretary; Report of Treasurer; Report of Board of Auditors; Reading of Communications; Reports of Sectional Organizations; Reports of Standing Committees.

Topic No. 1: The I. A. F. C. Educational Program. Chief Ralph J. Scott, Chairman, Educational Committee. (In this presentation Chief Scott will be assisted by members of the Committee and others.)

Thursday, September 21

Visit to the Golden Gate International Exposition.

Friday, September 22

Morning (9:30 a. m.) at Municipal Auditorium.

Topic No. 2: Welfare of the I. A. F. C. (General Discussion).

Topic No. 3: Revision of Constitution (General Discussion).

Afternoon (2:00 p. m.) at Municipal Auditorium.

Topic No. 4: "Prevention and Extinguishment of Fires in Petroleum Products," by Max Enfinger and H. J. Wilson, Fire Protection Engineers, through courtesy of California Oil and Gas Association, Fire Protection Committee.

Topic No. 5: "It *Can* Happen Here," by Roi B. Woolley, President, Westchester County (N. Y.) Fire Chiefs Emergency Plan.

Topic No. 6: "Assignment Systems and the Receipt and Transmission of Fire Alarms," by Captain J. I. Tufts, Chief Fire Alarm Operator, Fresno, Cal.

Round Tables:

(a) Winter performance of metal ladders.

(b) Should we have a Fire Prevention Day in the spring of the year?

(c) Fires involving gas storage (oxygen, hydrogen, acetylene, etc.).

Saturday, September 23

Morning (10 a. m.) at Municipal Auditorium.

Topic No. 7: "Hazards of Automobile Parking Around Apartment Houses," by Chief Walter F. Israel, Detroit, Mich.

Topic No. 8: "Fighting Brush Fires in Southern California," by Spence D. Turner, County Forester and Fire Warden, County of Los Angeles, Cal.

Round Tables:

(d) Squad company work in the small department.

(e) Transportation of gasoline through streets.

Afternoon (2 p. m.) Municipal Auditorium.

Unfinished business: Report of Secretary on attendance; New business; Selection of next year's Convention City; Election and Installation of Officers; Final adjournment.

All evenings are to be devoted to entertainment.

Chief Estes, Lewiston, Retires

After 30 years with the Fire Department of Lewiston, Maine, Chief Reuben E. Estes has tendered his resignation, because of ill health.

Ex-Chief Reuben E. Estes

Chief Estes, during his service with the department, always took an active interest in the various fire organizations, being a member of the State Association of Fire Chiefs of Maine, the New England Association of Fire Chiefs, and International Association of Fire Chiefs. The Maine Association at its meeting in June at Bath, and the New England Association at its meeting at Providence, made Chief Estes an honorary member of each of these associations.

He joined the department in 1909 as a substitute, was made a permanent call man in 1910, and a permanent man in 1917. In 1922 he was promoted to Captain, in 1931 was appointed Deputy Chief, and in July, 1932, was appointed Chief. J. W. RANDLETTE.

Fire Exhibit at N. Y. World's Fair

A century of fire-fighting in America will be graphically portrayed in the Court of Peace of the New York World's Fair on August 15.

A cavalcade of fire-fighting equipment used during the last century will feature the convention, national tournament and parade of the Firemen's Association, State of New York, and the Insurance Company of North America.

Sponsored jointly by the two organizations, apparatus deserving of places in museums will be paraded in the show place of the World of Tomorrow to highlight Volunteer Firemen's Day at the World's Fair.

A short procession, with the Queens County Veteran Volunteer Fire Companies and their bands, will launch the parade into the Court of Peace. The famous Mummers of Philadelphia will join in the parade.

The parade will assemble on Rainbow Avenue, near the Long Island Railroad Plaza, head down the Court of Communications and enter colorful Constitution Mall at the Trylon and Perisphere.

Demonstrations of fire fighting will mark the Court of Peace program following the parade.

The Exempt and Veteran Associations of Queens County will show the methods and apparatus used in early Colonial Days—the days of George Washington, whose inauguration 150 years ago, the World's Fair commemorates.

More modern apparatus and methods then will be shown, culminating with a thrilling exhibition of up-to-the-minute fire machines in action as operated by Nassau County volunteer fire companies.

A vaudeville entertainment will conclude the program.

The activities of Tuesday, however, will not conclude the week's program designed to accent advances in fire fighting.

On Thursday, August 17, a national tournament, sponsored by the Insurance Company of North America, will be held adjacent to the World's Fair by the Firemen's Association, State of New York.

The following day a parade, under auspices of the Firemen's Association, State of New York, will wind through the streets of Flushing, to disband at the World's Fair.

Mt. Shasta, Cal., Host to Firemen

A four-room house was erected by the Mt. Shasta Fire Department, in which to demonstrate methods of extinguishing various types of structural fires as a feature of the Northern California Firemen's Association convention, held June 11 at Mt. Shasta, Cal. Several types of nozzles, along with a sprinkler system and the proper method of ventilating were also demonstrated. A pit was dug near this house and a number of teams, composed of members of the Mt. Shasta Department, demonstrated the proper way to handle oil and gasoline fires with fog nozzles, foam extinguishers and straight streams. The citizens of Mt. Shasta were invited to attend the demonstrations and they turned out in large numbers.

Just prior to the demonstrations, a parade was held with various kinds of fire equipment, mainly for the purpose of creating interest in the demonstrations.

The ladies were entertained by a tour to the Mt. Shasta fish hatchery, one of the largest trout propagation plants in the world.

Bart W. Arundel, Placerville, Cal., is Secretary-Treasurer of the association.

Ex-Chief T. W. Haney Dead

Thomas W. Haney, for many years Chief of Fire Department, Jacksonville, Fla., died at his home at the age of 78, following a long illness.

He was a native of Atlanta, Ga., and was Captain in the Fire Department for ten years. He moved to Jacksonville in 1892 to become Chief and he served in that office until he retired in 1926 at the age of 65.

He was elected President of the I. A. F. C., at its New York convention in 1913 and presided at the New Orleans convention the following year.

Chief Haney was an ardent member of the B. P. O. Elks and was the oldest Exalted Ruler of the local lodge.

He is survived by his widow, one son, one daughter and a sister.

MODEL OF FIRE STATION SHOWS LANDSCAPING EFFECTS

Built to Scale of ⅛-Inch to Foot, It Reproduces New Station and Elevated Tank in Every Detail

THE model illustrated in the accompanying illustration was built by D. R. Richardson, of the architectural firm of Hansen & Waggoner, Mason City, Ia., and was exhibited in the booth of Mason City, in the North Iowa Building and House Furnishing Exposition held in that city. It is intended to take the place of a perspective drawing of the new fire sub-station and elevated tank now being built for the city and nearing completion.

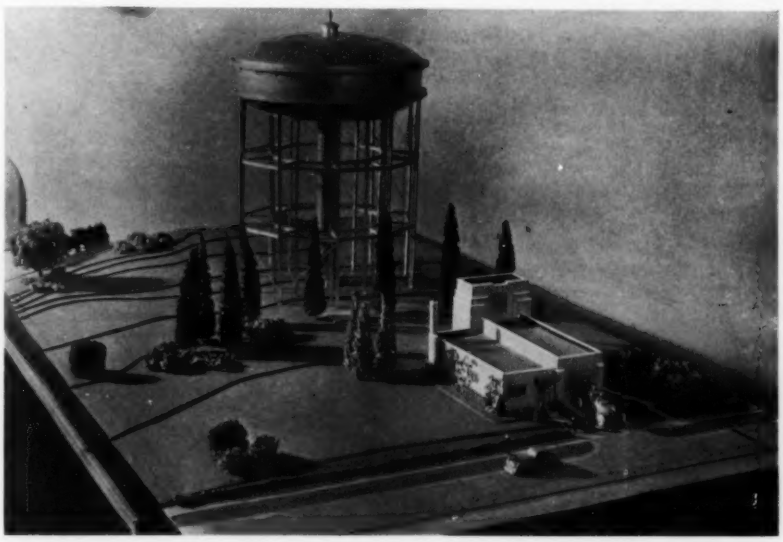
Model Carries Out Landscaping Effects

The model, which is 1/96th the size of the originals, is built on a scale of ⅛-inch to the foot and, according to Mr. Richardson, is correct as to every detail of the sub-fire station and elevated tank. The model, he pointed out, will also prove useful in carrying out the landscaping of the 1½-acre plot.

The station and tank, which are included in a PWA project of the city, are nearing completion. The exterior of the station is of ordinary brick, with limestone trim. The walls are of tile, with plastered ceilings. The floors of the apparatus room and pump room are of concrete, with linoleum coverings for the balance of the station. There is an Elgin built-in kitchen unit, consisting of range, refrigerator, and sink of stainless steel.

Layout of the Fire Station

The apparatus room of the station, 15 x 49 feet, is situated at the north side of the building, with the pump room 9 x 13.5 and hose tower, 7 x 9, at rear



Model of Mason City, Ia., Sub-Fire Station and Elevated Tank

in the form of an extension. On the south side of the station from front to rear are the office, 10 x 11, and watch desk room; dormitory, 15 x 18; locker room; toilet, and shower 7.5 x 9 and kitchen, 8.5 x 11. The accompanying plan will show the relative position of the various rooms.

Equipment and Personnel

The sub-station will be equipped with a 750-gallon triple combination pumper, with a 200-gallon booster tank; one 14-foot roof ladder and one 30-foot three-section extension ladder, both of aluminum. The company manning this sub-station will be known as Engine Company No. 2. An officer and two men on each shift will compose the personnel.

The Elevated Tank

The one m.g. tank which was designed and built by the Pittsburgh-Des Moines Steel Company, Des Moines, Ia., is 76¾ feet in diameter, and is 106 feet from grade to start of the umbrella roof. It is supplied by a seven-stage turbine pump of 1,500 g.p.m. capacity placed in a 12-inch well, 1,306 feet deep.

Illinois Holds 4-Day Fire School

Lecture room facilities at the University of Illinois, Champaign-Urbana, were taxed to the utmost by the 542 men who registered for the fifteenth annual Fire College, June 13 to 16. Sessions were held each day from 9 a.m. to 4:30 p.m., with baseball as relaxation each day, following the afternoon meetings. At 7 p.m., there was a gathering to review the events of the day and to plan the work of the following day.

A memorial service was held, under the direction of Harry K. Rogers, for the late Sherman V. Coultas, who as Fire Marshal, was particularly active in furthering the college.

Beside the question of handling larger registrations, and the added number that is expected next year, the School Committee is considering the publication of a school proceedings, so that each student can have a copy of the talks and the discussions. Lack of funds has prevented the publication of a proceedings prior to this. The college next year will be held June 11 to 14, with L. H. Provine, Director of the Fire College.

The following took part in the program:

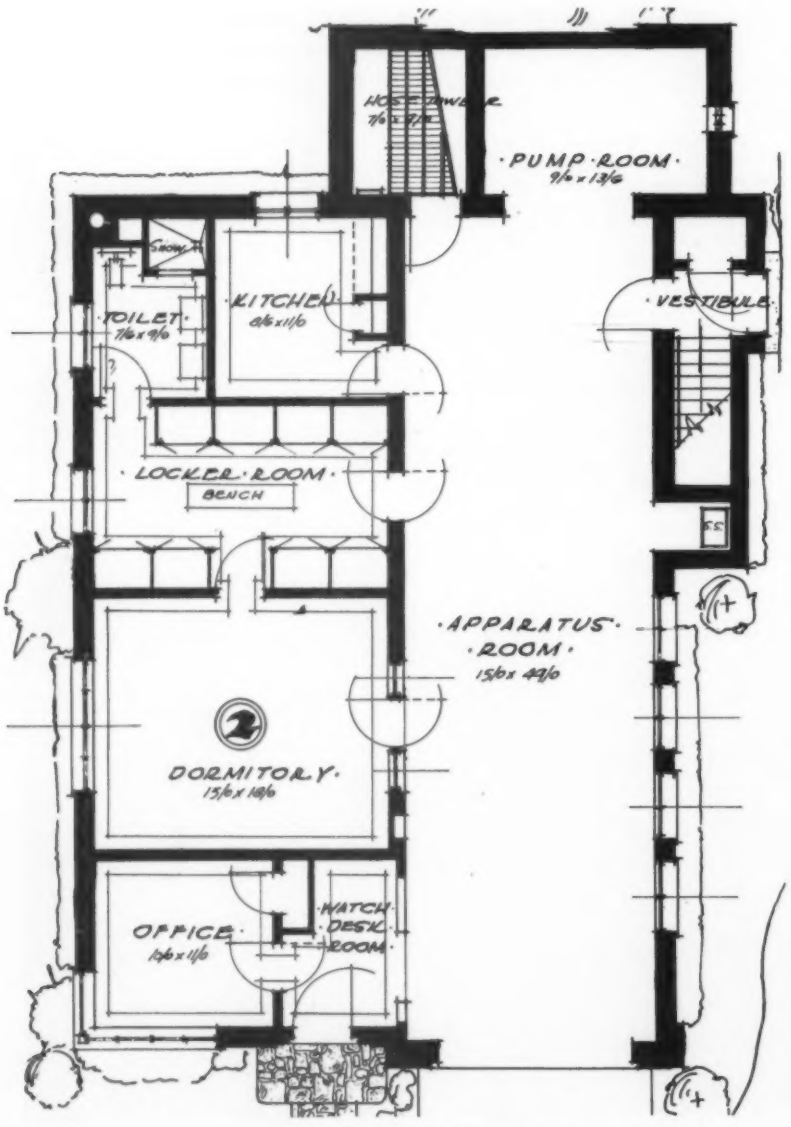
John Mersch, Evanston; Elmer W. Weidler, President, Illinois Firemen's Association, Mt. Olive; George H. Anderson, Assistant Fire Marshal, Illinois; A. H. Vineyard, Safety Engineer, Shell Petroleum Corporation, Wood River; J. R. Fleming, Mine Safety Appliance Company, Pittsburgh; Chief Earl Shephard, Marine; A. H. Gent, Engineer, Illinois Inspection Bureau, Chicago.

Chief Walter A. Finklein, Belleville; J. Burr Taylor, Western Actuarial Bureau, Chicago; Chief John E. Hutchins, Macomb; Chief John Link, Blue Island; Chief Connel Nicol, Sterling; Chief E. J. Ryan, Aurora, Chief R. E. Whalen, Elgin; Mike Thomso, State Highway Police; Harry N. Wolff, Bureau of Fire Instruction, Chicago Fire Department; Chief Frank Davis, Danville.

Clarence Goldsmith, Assistant Chief Engineer, National Board of Fire Underwriters; C. A. Herbert, District Mining Engineer, Vincennes, Ind.; James McSherry; Chief Fred Haderlein, Carlyle; R. C. Loughead, Chief Engineer, Michigan Inspection Bureau, Detroit; Richard E. Vernor, Manager, Fire Prevention Department, Western Actuarial Bureau, Chicago; Anthony J. Mullaney, Deputy Chief, Chicago.

District Chief Joe Schaefer, Memphis; Fire Marshal R. E. Whalen, Elgin; Chief Elmer Dicke, Downers Grove; Chief Waldo Erickson, Western Springs; Chief Tom Brooks and Chief Thad Fife of the State Fire Marshal's office; Chief Harry Kuehnen, Staunton; Sid Ulrich, Peoria; Dr. David J. Price, Bureau of Chemistry and Soils, U. S. Department of Agriculture; Chief Dan McFarland, Mt. Hope-Funk's Grove Fire Protection District, McLean; Simon Kellermann, Ill.; Chief Charles Foucek, Naperville; Paul Johnson, Oregon.

Chief William R. Stoneham, Wood River; Horatio Bond, Chief Engineer, N. F. P. A.; T. Alfred Fleming, Director of Conservation, National Board of Fire Underwriters and G. M. Kintz, Dallas Office, U. S. Bureau of Mines.



Plan of Sub-Fire Station at Mason City, Ia.

Reference Manual on Fire Department Pumps

The Educational Committee of the International Association of Fire Chiefs has announced the publication of a new reference manual on "Fire Department Pumps, Pumping Equipment and Pumping." This manual contains a complete analysis of the principles underlying the construction, operation and maintenance of fire department pumping engines, with fundamental treatment of problems involving the flow of water through hose lines. Technical details are reduced, insofar as possible, to the language of the layman. The manual consists of approximately 90 pages, size 8½ by 11 inches, contains many diagrams and illustrations and is bound in a heavy paper cover.

Copies may be obtained from the Headquarters Office, International Association of Fire Chiefs, 24 West 40th Street, New York, N. Y., at a price of $1.50 per single copy, postpaid. A special rate of seventy-five cents per copy is available to members of the Association. A discount of 10 per cent on the above prices is applicable on orders for 25 copies or more.

THE ROUND TABLE

For Practical Discussion of Current Fire Department and Fire Management Problems

LEAKS FROM UNDERGROUND GASOLINE TANKS

GASOLINE has potential dangers. Stored as required, and under approved conditions, it is comparatively safe. But when some unforseen condition arises, such as a leak in an underground tank, trouble may develop.

Gas will travel through the porous soil, along the outside of a pipe line, and will seep into adjoining buildings. Gasoline, when mixed with air in the right proportions, is violently explosive.

The experience of Chiefs in this matter, is contained in the following discussion. The problem of the discussion in full appears in the box on this page. So many replies were received, that it has been necessary to continue this discussion in the next issue.

Discussion of the Question

W. B. Miller, Sr., Chief, Columbus, Ga.: We do not make inspections for leaking tanks, as retailers are usually very careful about keeping up with any shortage that might show up. We do inspect our fire station tanks by the simple method of notching a stick and not using any gasoline from the tank for three or four days. You can then discover the leak by finding the gas line below the notch.

To test in a scientific way, I believe you pump from three to seven pounds of air into the tank. The gauge will show leakage by a falling pressure.

The largest percentage of leaks are found around the connection joints underground, occurring for the most part when the tank is being filled.

Charles H. Roberts, Capt., Fire Prevention Bureau, Orange, N. J.: There was only one complaint received from an owner of a service station in our city and this owner was not sure whether or not his tank was leaking. To make sure that the tank was leaking, we had it tested by the company supplying gas to this station. The tank was found to be in good condition and showed no leakage.

The ordinance of our city requires that six inches of concrete be placed on the bottom of the hole for the tank to set in, and that all filling be clean dirt and no ashes. Ashes are more or less chemicalized and may have a tendency to corrode the tank.

We test tanks of service stations on complaints of owners only. The testing of the tank is accomplished by pumping a pressure into the tank of about ten pounds, allowing the pressure to stand at least one hour. In the event of a leakage in the tank, it would show up in that time.

There has never been a leaky tank found in our city, since I have been in charge of this bureau, which has been for four and a half years.

Howard Travers, Chief, Baltimore, Md.: We have found three leaky tanks in our city. When such tanks are reported, tests are made by the Fire Prevention Bureau, who apply air pressure to the tank, when there is evidence of gasoline fumes.

Michael Keena, Chief, Hartford, Conn.: We have never encountered a situation where gasoline was leaking from underground tanks and finding its way into neighboring buildings.

We do not make inspections, but, as a preventative measure, the smallest tanks are placed at least ten feet away from the nearest cellar wall. Larger tanks are placed even farther away.

S. T. Porter, Chief, Washington, D. C.: We have experienced very little trouble with leaky tanks, as tanks are installed according to rigid regulations, controlling the size, material, distance to property lines and basements, etc. All tanks and piping are subject to an air test before excavations are back-filled. A thorough inspection of all gasoline service stations is made yearly in connection with applications for all annual licenses and all unsatisfactory conditions must be corrected before the issuance of a license. Tests of old tanks are made only if there is evidence of trouble. In many instances, leaks are found on new installations, either in tanks or piping, and these must be repaired before approval is granted for their use.

Leo J. Urbanski, Chief, St. Joseph, Mo.: We do not have any laws or inspections pertaining to the subject of leaking gasoline tanks in our city.

Robert Collatt, Chief, Burlington, Ia.: We have never encountered a situation where gasoline from underground tanks seeped into neighboring buildings. Howver, we did have an eight-inch concrete floor over a basement raised, the roof blown off and a 14-inch brick wall blown out of a one story garage. This was caused by fumes coming from a vent pipe, while an underground tank was being filled from a railway car. The vent pipe on this tank had been broken off under the sidewalk and the fumes followed some old sewer and water pipes, which were near the tank, a distance of about 100 feet into the basement of the garage. One of the employees of the garage lit a cigarette and the explosion occurred. This man lived about a day and died. This explosion proved to me that a leaky tank might do the same if there were pipes or a passage way near the tank leading into a near-by building.

We see that the tanks are set in sand and properly installed, although we do not make inspections of the tanks. However, most gasoline companies test their tanks for leaks.

I think the best test is to fill the tank with gasoline and cap it below the pump, then place a gauge in the top of the tank and pump ten pounds of air into the tank and watch the gauge for one hour. This takes about three hours of labor. Some of the smaller companies fill their tanks at night and measure them with a measuring stick and then again in the morning. The older tanks are tested more often than the later ones. We have no set time.

We have never had a leaky tank reported to us.

Lawrence E. Smith, Chief, Eau Claire, Wis.: We have never encountered a situation where gasoline has found its way to neighboring property from a leaking tank. However, we found one tank this spring that was leaking and it is the only one that I have any record of.

When tanks are placed in the ground, they are painted with asphalt and are imbedded in clean washed sand, free from shale and cinders, as they both have an effect on metal. Tanks are inspected twice a year by filling the tank and rodding. Any change in the measurement means

HERE IS THE PROBLEM FOR THE NEXT ISSUE

Have you, in your city, encountered a situation where gasoline was leaking from underground tanks and finding its way into neighboring buildings?

What methods do you employ to prevent such occurrence?

Do you inspect (or test for leakage) underground gasoline tanks?

In what manner is such inspection or test made? And how often?

Have any leaky tanks been found?

that the tank has to be taken out of the ground and repaired or replaced.

E. N. Whitaker, Chief, Tacoma, Wash.: No leakage from underground tanks has found its way into neighboring buildings in Tacoma.

Our flammable liquids ordinance will not permit the installation of a gasoline storage tank nearer than ten feet to any foundation wall, if above the level of the basement.

There is no testing for leakage in underground tanks after they have been installed. However, all underground tanks are thoroughly inspected before being placed underground. All underground tanks that do not carry the Underwriters Laboratories label are inspected by the City Boiler Inspector, using the A. S. M. E. code.

We have found leaky tanks.

Samuel J. Pope, Chief, Boston, Mass.: We had an occurrence where a 2,500 gallon tank was located in a concrete vault, under the basement floor of a garage, located in the heart of our high value district. This vault was covered with three six-inch movable concrete slabs. The first indication that something was wrong was the presence of gasoline fumes in the boiler room. Adjacent to the boiler room was a waste vault, with a self-closing fire-proof door. All waste material from the upper floors was collected and stored in this vault. When called to investigate the odor, I opened the door to the waste vault and found gasoline seeping through the concrete wall. I had all fires extinguished and autos moved by hand to street floor. Uncovering the tank, we found it to be floating in high test gas. This was a so-called aqua system and a broken flange permitted the gas to be forced out. This system is now prohibited.

Chief officers check in their respective districts by sales and delivery slips and by inventory, for leaks in underground gasoline tanks.

Some leaks have been found and the tanks removed. We pay particular attention to tanks located on filled land, knowing the presence of ash fill causes corrosion of the tank. We are contemplating a law to require annual pressure tests of all underground tanks.

George E. Walsh, Batt. Chief, Fire Prevention Service, Buffalo, N. Y.: We have, on rare occasions, encountered gasoline leaking from underground tanks and finding its way into neighwe had a fire from gasoline leaking boring buildings. On one occasion, we had a fire from gasoline leaking into a boiler room located in the basement of a six story concrete sprinklered building, used as a motor ramp garage. The gasoline flowed under the ash pit, causing a flash and opened six sprinkler heads, which extinguished the fire. It was assumed that the gasoline leakage came from tanks of an aqua system located on the premises.

After tests and finally replacing tanks, it was found that this was not the source of the leak. An eight-inch hole was drilled in the basement floor, near the tanks, to a depth of 12 feet from the street level. At this test, gasoline was found in considerable quantities floating on an underground water table, which prevailed at this level. About 1,200 gallons of gasoline have been taken from this hole over a period of six months.

THIS DISCUSSION IS TO BE CONTINUED

Due to the large number of replies that were received, it has been necessary to divide the material into two parts, and to conclude the discussion in the next issue.

At this writing about two gallons per day is taken out. This leakage is no doubt coming from some remote location, as a survey of several adjoining installations was conducted, the occupants of which reported no shortage. No test of tanks was made at these adjoining stations to date. We contemplate making tests of all tanks in this area.

When tanks are installed, they are inspected by the Fire Department to see that they comply with laws and ordinances permitting their use. Upon receiving a complaint of leakage, an inspection is made and when deemed necessary, a test of tanks is required. This test is conducted by the oil companies.

Our city ordinance requires that all tanks located within five feet of a cellar wall, unless the top of the tank is below the lowest floor of such cellar, must be incased in six inches of concrete. No tests are conducted for leakage by the Fire Department.

Some tanks have been found to leak after tests have been requested by the Fire Department, after a complaint has been received. Undoubtedly numerous leaky tanks have been found by the oil companies, which have not been brought to our attention.

Our experiences show that the oil companies are willing to correct any leaky conditions which are brought to their attention.

Victor H. Veit, Chief, Stamford, Conn.: I have encountered a situation where gasoline was leaking from underground tanks and finding its way into neighboring buildings. This particular case presented a very serious situation for quite some time.

One evening, not so very long ago, a complaint was brought to my attention about blazing ashes being taken from an ash pit in a furnace located in the cellar of an apartment house on Main Street. The janitor complained that every time he cleaned out the ash pit, the ashes would be blazing. Fortunately no explosion ever occurred.

This was a four story brick apartment house with stores on the ground floor. Almost directly in front of this building was a gasoline pump on the curb. In the rear of the building, but on another street, was a wholesale and pump service gasoline station.

Upon investigating, I found that the base of the ash pit was cracked in the center, from which something wet was oozing. I took a small quantity of wet ashes outside and touched a match to it. It blazed readily and immediately I was convinced that it was gasoline or some highly volatile liquid. My first thought was to place a guard in the cellar of the building, with instructions not to allow a flame of any kind within its confines. Anyone who would do as much as to strike a match was to be arrested.

My attention was then given to the underground tanks of the wholesale gas station in the rear. They had not been missing any gasoline, according to their records. I then instructed them to make a thorough check every night and report to me. The location of this station was on the north side of the apartment. From there, I went to make a check on the curb pump in the front of the building, which was on the south side. Nothing was uncovered there. In the meantime I had a hole dug in the ground, just outside the west side of the apartment. This was done only because the ground seemed to be damp. It was only dug a few feet when water was struck. On the surface of the water there appeared to be a film of oil. I took a sample and had it analyzed. It turned out to be gasoline. The question was, where was it coming from? It was not near any gasoline station, nor had we any record of a tank being nearby.

In the meantime the gasoline that was still oozing into the ash pit was being mopped up as fast as it would come in. A state of uneasiness was prevalent throughout the apartment, as the thought of an explosion manifested itself.

After several days had elapsed and all known tanks had been checked for leaks, no sign of a leaking tank could be found. Finally during the course of checking and rechecking and questioning various old timers in that neighborhood, someone remembered that an old gentleman had a private tank years ago on a spot a little northwest of the apartment. Fortunately this old gentleman was still living and was located. He admitted having an old underground tank and showed us the exact spot in which it was located. When it was dug up, it was found to contain a large quantity of gasoline. The tank was pumped dry and filled with sand and water. The mopping up process in the cellar of the apartment was continued, until all trace of gasoline had disappeared.

It is not hard to imagine the state of apprehension that prevailed among the tenants of the apartment building. For a time the owner was beginning to believe that he had struck oil, as it seemed as though it was coming from an unlimited source of supply.

The only chance of a recurrence of this condition would be where tanks had been in the ground ten years or more. We have records of tanks as far back as that. We have had no trouble of this nature from either gasoline or fuel oil tanks that have been installed during the past six years. This, I can safely say, is attributed to the very rigid regulations under which they are installed. These regulations are handed down by the Common Council of this city and are carried out to the smallest detail by our Fire Marshal, who is my Deputy Chief. These regulations conform with state regulations in detail.

Before a gasoline or fuel oil tank is installed, an application for a permit to do so must first be made to the Fire Marshal. He examines and approves, or disapproves, the proposed location. He examines the tank as regards to the specifications required for the various size tanks. A

complete record is kept on file of each installation. If for any reason, the permanent use of any of these tanks is to be discontinued, this is recorded on the permit and the tank filled with sand and water.

Frank Cochrane, Chief, Phoenix, Ariz.: We have encountered leaking gasoline tanks, but none with gasoline finding its way into neighboring buildings.

We require that the tanks be installed one foot below the lowest level of the building.

Only when unaccounted loss of gasoline is noticed is any inspection or test made. In such unaccounted cases, we suggest that the tank be taken up and inspected for holes. Three leaky tanks have been found in the last two years.

G. Brown, Chief, Winston-Salem, N. C.: We have never had a situation where gasoline leaking from a tank found its way into neighboring buildings. All tanks are buried so that the top is below any sub-surface structure and at least 35 feet away from it.

John Luxembourger, Chief, Santa Ana, Cal.: We have never encountered gasoline from underground tanks seeping into neighboring buildings.

We require that all tanks and pumps that are installed have the Underwriters' label on them. They are also subject to strict inspection.

Earl A. Traeger, Chief, Minneapolis, Minn.: We have a record of two instances where gasoline tanks have leaked. One occurred in January, 1927, at a filling station located at 37th Avenue S. and Lake Street. It was found that the tank had rusted and allowed gasoline and fumes to seep into three store buildings, adjacent to the filling station proper. These fumes caused an explosion and fire in the basement of the stores, with a damage of $2,200 from fire. The other case occurred several years ago at a filling station located on University Avenue and 13th Avenue N. E. This gasoline tank rusted and started to leak and fumes seeped into basements of several homes in the block and also seeped into the basement of a drug store two blocks away. There was no explosion or fire, but the smell of fumes gave cause for complaint and upon investigation by the Fire Prevention Bureau, the leaky tank was found and ordered replaced.

The Fire Prevention Bureau insists that all buried tanks be entirely surrounded by clean sand and that they conform to the regulations for buried tanks as outlined in Section 21 of the Flammable Liquids Ordinance. This section reads as follows:

"Material and Construction of Underground Tanks. Underground tanks shall be constructed of galvanized steel, of open hearth steel or of wrought iron of a thickness not less than specified in the following table:

Gallons Capacity	Minimum Thickness of Material, Gauge U. S. Standard	Lbs. Per Sq. Ft.
1 to 285	16	2.50
286 to 560	14	3.125
561 to 1,100	12	4.375
1,101 to 4,000	7	7.50
4,001 to 12,000	¼-inch	10.00
12,001 to 20,000	⅜-inch	12.50
20,001 to 30,000	⅜-inch	15.00

"For tanks of 1,100 gallons and more a tolerance of 10 per cent in capacity shall be allowed.

"(a) Tanks of open hearth steel or wrought iron lighter than No. 7 gauge, U. S. Standard, shall be galvanized. All joints of tanks shall be riveted and caulked, brazed, welded, or made tight by some equally satisfactory process. Tanks shall be tight and sufficiently strong to bear, without injury, the most severe strains to which they may be subjected in use. Shells of tanks shall be properly reinforced where connections are made, and all connections made through the top of the tank above the liquid level.

"(b) Tanks for systems under pressure shall be designed for four times the maximum working pressure, and tested to twice the maximum working pressure.

"(c) All iron or steel tanks shall be thoroughly coated on the outside with tar, asphaltum or other suitable rust-resisting material. Where soil contains corrosive substances, such additional protection shall be provided as may be required by the Chief Engineer of the Fire Department.

"(d) With the approval of the Chief Engineer of the Fire Department, tanks of copper or other suitable material may be used if, after the necessary handling incident to installation, they are equivalent in strength, rigidity, durability and tightness to the steel or iron tanks hereinbefore described."

Tanks are inspected by the Fire Prevention Bureau when installation is made and not approved unless they conform to Section 21. All tanks are tested for leakage by owner when installed.

When installed, the tank is sealed and tested with air pressure, using the proper gauge.

The owner of the tank keeps track of gasoline or other flammable liquid by gauging or measuring and if variations show in intake and output a test is made to determine whether or not there is a leak.

A few cases have been brought to our attention where leaks have been found in tanks containing flammable liquids, and in each case the tank was ordered replaced.

W. M. Mullins, Chief, Roanoke, Va.: When a company notices or has reason to believe that they have a leak in their gasoline tank, we apply an air test to the tank, leaving it on all night or longer, if necessary. By applying this air test, we have found only one leaking tank. In my opinion, this is the only safe method to determine a leak.

We have had two leaky tanks. In one case the gasoline traveled approximately 100 feet underground to basements lower than the tank. In one case, when the leak was discovered, the basement floor was found to be covered with gasoline. Fortunately for us, it was summer time and there was no fire in the basement at that time.

W. S. Knight, Chief, Salt Lake City, Utah: We have not had such a situation where gasoline leaking from underground storage tanks entered a neighboring building.

Underground tanks are inspected at installation only. Leaky tanks have been found by owners, presumably because of unaccountable shortages of contents.

Edwin P. Erb, Superintendent, Bureau of Fire, Allentown, Pa.: Through complaints received, we have within the last three years encountered situations where gasoline was leaking from underground tanks and finding its way into neighboring buildings. Of the dozen or more complaints, all dangerous, two of them presented unusual conditions. In the one case complaints had been received over a period of many months, and for a while we were unable to locate the source of the trouble.

The occupants in a dwelling house alongside of a wholesale commission house were sick for weeks from gasoline fumes and also afraid of a probable explosion. The commission house made no effort to investigate, stating that the odor came from mufflers on trucks idling at the loading platform in the rear of the building and under the roof.

The pumps were located on the platform and the pipes and tanks were ten feet away from the dwelling. The odor was most noticeable in the afternoon, when they filled the tanks of the trucks for the following day. We applied the air pressure test on tank and pump, but it did not show any leak. Upon further investigation it was found that the two-inch brass pipe in the pump had a nut lock attached and every time the truck tanks were filled, there was a leak and the gas trickled along the pipe. It was only by having the hand on the pipe that you could feel the gas trickling along the pipe to the ground. After this was discovered, it was easily corrected.

The other case was due to a leak in a tank of a large service station in the heart of the city. Gasoline flowed into the basement of a large apartment house adjoining the station.

As soon as we received the call, we had the police guard all entrances to the house, ventilated the building throughout and had all illuminating gas and electric current turned off. A truck load of sand was sprayed with wooden shovels over the concrete basement floor and sand was also thrown over the jack stove. Immediately a crew of men were put to work and stayed on the job continuously until the leak was found and repaired. While these operations were going on, no one was allowed in the basement, unless he was equipped with shoes without nails.

No local provision has been made for periodical inspection of underground tanks. I believe, however, ordinances should be passed requiring this to be done.

Inspections or tests for leaks are only made when complaints are received and a pressure test is made of the tank and pump, including all connections. In this way the trouble is usually located.

We have found at least a dozen or more leaky tanks within the last three years.

* * *

Answers to Previous Question

The following replies were received in answer to a previous question on which municipal department should be responsible for maintenance and inspection of hydrants and the removal of snow therefrom:

Harry A. Klein, Chief, Hope Farm, N. Y.: I personally know of cases where fires got away simply because one or more hydrants were out of order or shut off and no notice of the same given to the Fire Department.

In one case not long ago, four hydrants had no water when opened up, the mains supplying them being closed by the Board of Public Works. Lack

of cooperation between the board and the Fire Department in this case resulted in a minor fire becoming a conflagration, resulting in the destruction of some 15 large factory buildings.

I have seen hydrants on dead end mains opened, and from the looks of what has come out of them, they had not been opened for several years. It often seems that in small cities and villages there is no particular person responsible for the inspection and testing of hydrants.

Under such conditions I feel it is up to the Chief to know what condition the hydrants are in, as he is the man using them. Every hydrant should be opened and inspected at least twice a year, spring and fall, regardless of how small the village.

August Schmidt, Chief, Rock Island, Ill.: We are not charged a rental for fire hydrants.

The Water Works Department takes care of maintenance, inspection and removal of snow from hydrants.

S. T. Porter, Chief Engineer, Washington, D. C.: The D. C. Fire Department is not charged rental on fire hydrants.

The Municipal Water Department should be responsible for maintenance of fire hydrants, because they have charge of the maintenance of water mains and all underground work and thereby acquire men with specialized knowledge. Repairs can thus be made more effectively.

The Water Department should also have charge of inspection of fire hydrants, as they would be better able to detect reasons for leakage, observe and detect in advance possible mechanical difficulties, and thus eliminate failure of hydrants. With one group of employees performing the work constantly, greater familiarity with the mechanical details can be obtained.

Some municipal department other than the Fire Department should be responsible for the removal of snow from fire hydrants. If the Fire Department were called upon to perform this work, it would require men to be absent from their companies for extended periods and at times when the worst weather conditions existed.

James H. O'Neill, Chief, Niagara Falls, N. Y.: The Bureau of Fire pays the Bureau of Water $18 a year rental for each hydrant, a total of $32,220 a year. The Bureau of Water then pays for all repairs, painting, inspecting and for installing new hydrants.

R. E. Whalen, Chief Elgin, Ill.: The Fire Department is charged $10 per year rental for each hydrant in the city and the Water Department is responsible for maintenance, inspections and removal of snow and other obstructions. We have a very efficient maintenance crew and very seldom do we have a hydrant out of service for more than a few hours. If all Water Departments worked in cooperation with the Fire Department, as ours does, I think the best place to leave these duties would be with them.

Herman E. Gutheim, Chief, Cambridge, Mass.: We have a municipally owned water works, which is an efficient organization, under a capable Superintendent. We have wonderful cooperation between it and the Fire Department. No charge is made for any water service.

From our experience I should say the Water Department should have the care and maintenance of all hydrants.

Hydrants are inspected twice each year, spring and fall, and the spindles and caps oiled.

The Fire Department keeps the hydrants clear of snow on main thoroughfares and requests the owners or occupants to keep the hydrants in front of their respective buildings clear.

Howard Travers, Chief, Baltimore, Md.: We are not charged a rental for fire hydrants.

The Water Department, in my opinion, should be responsible for maintenance, because it makes all installations and controls the service generally.

The Water and Fire Departments should make inspections in order to ascertain that hydrants are kept in such shape as to be available for service at all times.

The Fire Department should remove snow from hydrants, in order to make them available for immediate use and to familiarize the firemen with the locations of the hydrants.

The Fire Department in Baltimore maintains and operates the High Pressure Fire Service, in all details, and it is felt that this is for the best interest of the fire service here.

Charles A. McGinley, Chief, East Orange, N. J.: The water plant and facilities are owned by the municipality. No rental or service charge is made to the Fire Department at any time.

It is my opinion that the Water Department is rightfully responsible for the maintenance of hydrants, as they have expert mechanics and proper parts and equipment to do this work efficiently and economically.

Inspection of hydrants in East Orange is now carried on by members of the Fire Department. This is justified, in that we know the condition of all hydrants first hand, and then too, members of the department become more familiar with the location and operation of the various types of hydrants in the city.

I believe the Fire Department should remove snow from hydrants, as it is of direct concern to the Fire Department, more so than to any other department that all hydrants be immediately accessible. Any encumbrance which would delay the operation of a hydrant would reflect on the Fire Department.

Thomas J. Phelan, Chief, Trenton, N. J.: We are not charged a rental on fire hydrants.

I believe the Water Department should maintain fire hydrants, because of the fact that it is familiar with the mains, reservoirs, etc., and has the personnel and equipment to do the work.

The Fire Department should make inspections, because it is vitally affected by the operation of fire hydrants.

The Street Department should be responsible for removing snow from the hydrants, because they have the equipment necessary to do the work.

I am of the opinion that, in removing snow and making inspections the work should be done under the supervision of the Fire Department and with one purpose in view, that of having the hydrants available and ready for any emergency at all times.

Walter Scott, Chief, Kearney, N. J.: There is no charge in our city for the use of hydrants.

The Water Department should be and is responsible for maintenance of hydrants in Kearney, for reason of their ability and equipment to repair them.

Inspection of hydrants is made by the Water and Fire Departments at frequent intervals, so we may feel sure that they are in good condition at all times.

Removal of snow from hydrants is done by the Water and Fire Departments, with the assistance of the Street Department in bad storms.

Arthur C. Jacques, Chief, New Brunswick, N. J.: We are charged a rental of approximately $20 a year.

The city of New Brunswick owns and operates its own water works, and being well equipped with tools, etc., and a well trained force, they are in a better position to maintain hydrants.

The inspection of all hydrants is made semi-annually by the Water Department. This semi-annual inspection keeps them in an operable condition at all times.

The removal of snow from hydrants is done by a crew from the Water Department, as it is required to maintain the hydrants in an operable condition at all times.

Ross B. Davis, Chief, Philadelphia, Pa.: We are not charged a rental for fire hydrants, as the water works is municipally owned.

The hydrants are maintained by the Bureau of Water. Members of the Bureau of Fire check the hydrants and submit a report on them, one copy of which is sent to the Bureau of Water and the other retained at Fire Headquarters.

Snow is removed by the Department of Public Works, as it is essential to have it removed immediately.

William H. Coffey, Chief Engineer, Passaic, N. J.: We pay a rental of $36,808 for 629 hydrants.

Our Director of Public Safety is responsible for the maintenance of the hydrants. He has control of the Fire Department, where the most water is used in case of serious fires.

Inspections are made by our Passaic County Water Commission, but should come under the supervision of the Fire Department, as we are about the only department that has the use of them at all times. If this were placed under our supervision, we would know at all times just what the conditions are in case we are called upon to use them.

Snow removal is under the jurisdiction of the Department of Public Works, but when the department cleans the road with their scrapers, most of the snow is pushed up against the hydrant. We would suggest that the individual home owner see that the snow is removed from in front of the hydrant which would be used in case of fire.

William Sorenson, Chief, Council Bluffs, Ia.: Our water system is municipally owned and we therefore are not charged rental on fire hydrants.

The Water Commission takes care of maintenance, inspection and even snow removal.

CRANSTON, R. I., APARTMENTS RAZED BY MORNING BLAZE

3 Dead and 7 Critically Injured—Fire Sweeps Rapidly Through Building, Supposedly Fireproof

EVEN when fire broke out on June 19 in the four-story Roger Williams Manor, a 54-apartment structure in Cranston, R. I., the occupants were not overly alarmed. Each was secure in the belief that the building was fireproof.

But the fire which broke out at 5 a.m., spread rapidly and demonstrated that the structure never had a reasonable claim to the term "Slow-burning construction." Flames spread rapidly—very rapidly, and when the first fire companies arrived, flames were shooting out from nearly all the windows.

Photo by Charles L. Booth

Ruins of the Roger Williams Manor in Cranston, R. I.

Occupants became excited. Many held on as long as they could and then jumped. Three persons lost their lives and seven were critically injured, some suffering from fractured spines.

The following description by Lieutenant Baird, in a report to the state police, gives an official account. He stated:

"1.—The fire occurred at 5:43 a. m. on the morning of June 18, 1939. Three people lost their lives, and seven persons, all tenants of the building, were injured. A total of thirty-four persons, embracing Cranston Fire Department officers, the original owner and builder of the building, the building architect, representatives of the present owners, the superintendent and occupants of the building, were interviewed by the Inquest Board, and their statements are on file at State Police Headquarters.

"2.—Cause: The complete destruction of the building rendered it impossible to conclusively ascertain the cause of the fire. The seat of the fire, on first observation, indicated it first broke out in the vicinity of the third and fourth floors, in the northeast corner of the north wing. There is no evidence of incendiarism.

"3.—Evidence showed that the fire traveled very rapidly, after discovery, and that it had gained considerable headway before discovery.

"4.—The first notification to the Cranston Fire Department was by still alarm, and but two pieces of apparatus responded. A lapse of seven minutes occurred between the sending of the still alarm and the sounding of a general alarm. If the first notification had been a general alarm, it is probable that all available Cranston Fire Department apparatus would have responded. The delay in producing man-power and equipment at the scene was vital to the chances of trapped tenants. There is evidence to show that the units of the Cranston Fire Department responding to the alarm were insufficiently equipped in man-power and equipment to cope with a fire of this nature in this type of building. The Fire Department did the best that it could under the circumstances.

"5.—It was conclusively indicated by the testimony that this building was of a construction which must be judged grossly inadequate as regards fire safeguards in structures used for like purposes. It is established that the material used for construction of partition walls, corridor walls and passageways leading to so-called fire towers, was not of a fireproof nature. Also, the stairways in fire towers were not of fireproof material. If the corridors and passageways were of fireproof materials, it is possible that many of the occupants could have escaped through regular exits, but, due to this type of construction, the incidental heavy volume of smoke made egress along passageways practically impossible.

"6.—There is testimony to the effect that many of the tenants were under the impression that this building was a fireproof structure, and several of the tenants interviewed asserted that the superintendent of the building implanted this impression when they were negotiating for occupancy of apartments.

"7.—The testimony also shows that if there had been a method of sounding a general alarm throughout the building to notify tenants of fire, it is possible that such an alarm would have provided sufficient time in this instance to allow escape. The testimony indicates that the great majority of tenants were first warned of the fire by the screaming of those who were trapped. (Most of the occupants were asleep when the fire was discovered.)

"The State law pertaining to buildings of this type is not specific. It leaves safety requirements up to the judgment of local Inspectors of Building.

"The inquest reveals no violation of State law."

Fight Fire in Power Lines

By some unexplained stroke of luck, an aviator is alive today to tell how his plane struck a 12,000-volt power line in San Diego, Cal. The plane was suspended by the wires, forty feet above the ground. The flyer escaped by moving along a wire, hand over hand, to a nearby pole, and then he climbed down to the ground. The plane immediately thereafter burst into flame.

Firemen used a fog nozzle to put out the fire. Only the motor and the ribbed skeleton of the plane remained, as shown in the cover illustration.

WHAT'S BURNING

THE following list includes fires of $50,000 loss and over in the United States and Canada, for the month of July, 1939. These figures, compiled from the telegraphic reports, are based on estimates made at the time, and are subject to later investigations and consequent revision. Taken as a whole, however, they are an approximately correct view of the losses incurred. The figures represent loss in thousands of dollars.

Month Ending July 31	Loss in Thousands of Dollars
New Orleans, La.—Plant of Templeman Lumber Co., damaged	70
Camden, N. J.—Store of Antrim Hardware Co., and Standard Oil Co. plant	80
Republic, Wash.—Nicholes and Lyons buildings destroyed	70
Atlantic City, N. J.—Concession bldgs. bet. Missouri Ave. and Columbia Place	80
Norwood, Mass.—Whse. of Norwood Lumber Co., destroyed	65
Middle Sackville, N. B.—Store and whse. of Joseph L. Black & Sons	65
Hobart Mills, Cal.—Property of Los Angeles Iron & Steel Co.	170
Morehead, Ky.—Business property owned by Alf Caskey	65
South Fallsburg, N. Y.—Hotel Lakeside damaged	80
Lancaster, Pa.—Plant of the Lancaster Malleable Castings Co.	50
Providence, R. I.—Coal pockets of Eastern Coal Co.	80
Spokane, Wash.—Whse. of Round-up Grocery Co. damaged	100
Valley, Neb.—Cattle barns and other property of J. D. Whitmore	80
Morehead, Ky.—City Hotel and several stores	65
Santa Rosa, Cal.—Henry Laws Lumber Co., damaged	50
Des Moines, Iowa—Bakery of Zinsmasters Breads, Inc.	170
Yale, Okla.—High school bldg. damaged	50
Bangor, Me.—Property of Utterback Motors Co.	50
Marshall, Tex.—Bass-Ellis Lumber Co., planing mill, 2 mi. north	50
Houston, Tex.—Factory of Mixie Mattress Co., damaged	80
Chicago, Ill.—The Graver Tank Works, East Chicago, destroyed	50
Princess Anne, Md.—Elementary school destroyed	125
Fairhaven, Mass.—Yacht "Neelia" owned by Thos. H. Kearns of New Bedford	50
Montpelier, Vt.—Property of United Granite Co.	80
Mayo, Fla.—Six buildings in business section destroyed	50
Portland, Ore.—Peninsula grade school damaged	50
Bedford, Ind.—Office and yards of J. H. Moore Lumber Co., destroyed	70
Pittsburgh, Pa.—Stockyards on Herr's Island, damaged	65

Madison, Wis.—Stratford Apartment bldg., damaged 65
South Bend, Ind.—McHenry-Millhouse, mfg. div. of United States Gypsum plant..... 50
Philadelphia, Pa.—Bartram Garage and contents of bldg..... 50
Drumheller, Alta.—Equipment at Murray Colleries, East Coulee..... 80
Detroit, Mich.—Sun Building, occupied by business establishments 170
Aurora, Mo.—Majestic mill damaged..... 200
Chehalis, Wash.—Property in business section 170
Portola, Cal.—Plant of Feather River Lumber Co. 170
Linden, Tex.—George Hotel damaged..... 50
Racine, Wis.—Half block of business property 80
Wilkes-Barre, Pa.—Lumber yard and two dwellings in southern section of city.... 170
North Little Rock, Ark.—Topf & Wright bldg., destroyed 80
North Sacramento, Cal.—Hewitt Market bldg. destroyed 60
Springfield, Ill.—Feed mill of J. Schaefer & Sons, damaged 150
Locust Valley, N. Y.—Home of Albert H. Diebold destroyed 400
Macon, Ga.—Rhodes Furniture store and adj. property 50
Plumville, Pa.—Rossmoyne flour mill, owned by T. H. Frantz, situated near here..... 50

Chief O'Hearn in Hospital

Chief John W. O'Hearn, Watertown, Conn., is confined in the St. Elizabeth's Hospital, Cardinal O'Connell House, Brighton, Mass., where he went for an operation. He is expected to be out in about two weeks.

Chief Peter C. Spence Dead

Peter C. Spence, the last civilian Chief in the Bureau of Fire Prevention, New York City, died at his home in his 66th year, following an illness of two months.

The Late Peter C. Spence

Born in Elizabeth, N. J., he received his B.S. and C.E. degrees from New York University.

He started work with the Dock Department 50 years ago, while he was studying engineering. He served several city departments and then engaged in private practice. On April 16, 1914, he was appointed to the State Department of Labor and, in 1922, was appointed by the late Commissioner Thomas J. Drennan to the post of Chief of the Bureau of Fire Prevention.

He fought the McCall Bill which transferred to the Department of Buildings, the Bureau of Fire Prevention, in 1932. He worked hard for the Insullbuch bill, which was designed to return the bureau to the Fire Department.

Mr. Spence was a bachelor and is survived by a sister.

Chief Casey Loses Brother

Chief Cornelius Casey, Troy, N. Y., lost his brother Philip, who was a director of the Union National Bank in that city. Members of the board prepared a lengthy tribute to the late Mr. Casey, in which they said:

"He was an honest man; of the kind who considered always what was right and did it whatever the cost. He built just as the contract read, and better than he knew, and all that he has built, whether of stone and mortar, or of character and friendship, stand as monuments to his skill, his fair dealings, and integrity."

Fire Protection for the Home

In a large broadside, illustrated with many photographs, Chief Barney J. Houston and Fire Marshal L. G. Schraffenberger, have presented information to show the residents how to safeguard their homes from fire.

A large illustrated cross section drawing of a home shows the location of some of the more common fire hazards in the home.

Designed along similar lines, the department will now prepare a similar piece showing industrial fire hazards.

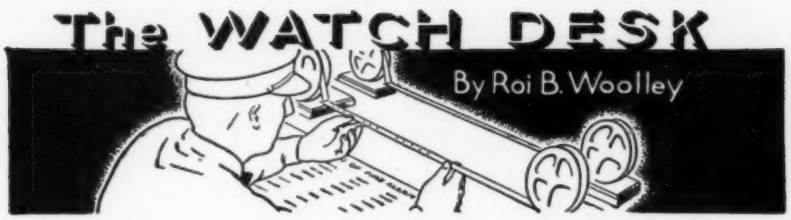
High Rating for Richmond, Cal.

Winning records for its fire protection work has become a habit for Richmond, Cal. It received honorable mention in the National Fire Waste Council contest.

In 1928, the city won the Thomas Ince Trophy for the best record in the Pacific Coast district, covering eleven states. The same year it won the Louis B. Mayer trophy for the best record among cities between 20,000 and 100,000 population.

In 1928, 1929, 1934, 1935, 1936 and 1938 it received certificates from the National Fire Waste Council.

The 30TH. FIRE FACTS BY OTIS SMITH
FIRE LADDERS—
The first practical wood factory-made ladder, the BANGOR first appeared nearly a hundred years ago. It disappeared with the shrinkage in the supply of Maine spruce.
Norway Pine, found principally in the Great Lakes region, has practically disappeared for fire ladders.
Douglas Fir, also known as Washington Fir, & Oregon Pine, IS now used almost exclusively for fire ladders. This wood is getting scarce and soon the price will be prohibitive.
It is predicted that wood fire ladders will be museum pieces in the not far distant future. THANKS TO FIREMAN LESLIE HOERTICH KENOSHA, WIS.
PHILADELPHIA PA.
INDEPENDENCE HALL IS PROTECTED BY FIRE BOX 1776---AN APPROPRIATE NUMBER FOR THIS HISTORIC BUILDING. THANKS TO ED. SPRANGERS.
RAPIDLY TAKING THE PLACE OF THE PHONE--ARE THESE SPEAKER UNITS--BEING BUILT BY THE BALTIMORE FIRE DEPT.
CONTROL BOX AND SPEAKER



Our inquiring reporter overhauls the firemanic news of the day

Philadelphia Pencillings

A Quaker City reader sends us items about (1) a woman who saw a man making frantic motions from window of an abandoned bank building and complained to cops that the guy was "trying to flirt with her," whereas all he wanted was some way to get out of the locked building. Truckmen, with ladders did this for him. (2) Fire Department dispatcher, who went promptly into action when a feminine voice pleaded over the phone *"Send someone right away—please hurry."* Minute or so later, when trucks and Braves roared up before door of Mrs. Joseph Smarkola, she explained *"Oh. . . . It's you! I just wanted a taxi."*

The Bird Loved "Butts."

A cigarette butt and a bird set fire to the Shelley (Ind.) municipal park building. After the volunteers had extinguished the blaze investigators found it had started in a sparrow's nest where a bird had apparently carried a lighted cigarette. 'Nother reason, folks, for dunking your cigarettes. Give the butt "the bird"—so the bird won't get the butt.

A "Fourth" Fireworks Casualty

James Wright, aged 5, Phoenix (Ariz.), was a fascinated spectator at a fireworks display. One of the sparks ignited a small fireworks stand in which he was standing. He was dead from the resultant fire before his father could reach him. A companion, George Clark, Jr., crawled to safety.

Fire Alarm Saves Four Firemen

According to our New England newshawk, a bell alarm for a grass fire in Taunton (Mass.) probably saved four firemen at Station 3 from serious injuries. They would have been on a hose tower washing hose when a counterbalance weighing 1,000 lbs. crashed to the basement of the tower. The weight, composed of 25 iron disks, is used on clapper of the bell. They crashed on the second round of the bell, just after the Braves had left the station to respond to the signal, falling through four by ten timbers and a concrete floor into the cellar.

We Advertise The World's Fair

This'un comes via the "Chief" and William Wallace, Elmira Heights (N. Y.). Seems that the rays of the sun, on a hot Sunday, at the Flushing Meadow's grand galaxy, yclept the N. Y. World's Fair, shone on a dozen or so very special glass windows of the Communication Building. Pretty soon the wooden window frames were smoking. Luckily the blaze was discovered by fireman Frank Burke, of 138 Truck, in Corona, who happened to be inspecting hydrants at the time and he, with the aid of one of those handsome troopers on guard duty at the Fair, extinguished the fires and ripped out burning sills. Reports hath it there was 'ell to pay up the Midway come Monday and tests were made instanter of the magnetism of the glass, which proved that sun, wood and said glass don't go well together.

$11,997 Embarrassment

Newshawk, Wm. (Bill) Patterson, Pittsburgh (Pa.) Brave, sends us the sad, sad story about the predicament in Swissvale (Pa.). Seems that Swissvale officials and citizens are upset because the borough's nice new streamlined 265-inch wheel-base, $11,997 truck is too long to navigate the streets. Property owners claim they'll have to cut off corners and pull in sidewalks to enable the elongated pride and joy of the Swissvale department to navigate streets. The job has a special bronze plate with names of City Council thereon, but justa same, folks are watching fires from windows instead of sidewalks these days, in Swissvale.

Bussman's Holiday Backfires

Our Quaker City correspondent tells us about fireman Wm. Richards of Scranton (Pa.) who took a bussman's holiday on a day off and visited a suburban firehouse. While there an alarm came in and William hopped on the truck "just for the ride." However, it wasn't any holiday, when he discovered that it was his own house afire.

July 4th Jottings

Reported fatalities from fireworks throughout country over 4-day weekend, were four, but total holiday toll was placed at 679 with auto and drowning fatalities in lead. . . . Most serious fire on Fourth was $110,000 Atlantic City boardwalk blaze. . . . Though harried by war, China managed to send $532,000 worth of small firecrackers to America in 1938 to make jobs harder for firemen, policemen and medico's. . . . Number of persons injured by firecrackers and fireworks celebrating the Fourth throughout metropolitan New York were 915, an increase of 69 over year previous; luckily, no fatalities. . . . Charles Parker, 79, Athol (Mass.), was held by police because, when annoyed by boys who chucked firecrackers at his door, finally dropping some down his chimney, he got a gun and fired birdshot into group. . . . An appeased Dumont (N. J.) group of Vamps marched in July 4th parade, directly behind the high school band. It develops that after last Memorial Day parade Vamps served notice they were through parading, because they had to bring up rear of procession. After much palaver, Citydads promised to make amends so this Fourth, Vamps, 45 strong, marched with 25 women of the auxiliary, at *head* of line. . . . In Hollywood 25 surprised boys shot free firecrackers, cap pistols, etc., all afternoon and in evening went haywire with night fireworks and were paid for doing this. Paramount chose the holiday to film a special Independence Day sequence. . . . . Violations for illegally selling and shooting fireworks throughout nation went skyrocketing as Police and Fire Departments enforced laws. . . . One of holiday tragedies was in England, where an English major, Laurence Foster, who had married an American girl, attempted to celebrate Independence Day by firing an old cannon. After three rounds, it burst, killing one woman, injuring two English officers. . . . In Natick (Mass.) Mrs. Adelaide Griffin, 66, was stricken by heart attack and died from excitement when skyrocket, shot off in daylight, ignited roof of her home.

Hot Off the Tape

While 18-year-old J. B. Bridges, Selma (Ala.), was pouring gasoline into running tractor, gas exploded, splashing youth with flame. His father hurled him into well, saving his life. . . . Twenty-five patients of Oakmount Sanatorium, Holcomb (N. Y.), were saved when fire wrecked structure. . . . John Davis, aged 11, played with shaving lotion and matches. Lotion smeared face was ignited. John went to Bayonne (N. J.) hospital. . . . Worst fire in history of Estonia destroyed 200 houses in town of Peteri. . . . Six persons died from inhaling acid fumes in fire which swept print shop in Chatelaudren (Fr.). . . . Braves of Chatam (Va.) arrived too late at downtown blaze because thieves had siphoned gasoline from fire truck. Fire loss $20,000. . . . Fire in his car in blazing garage shorted horn, awoke Gordon Derby, Indianapolis (Ind.), who called Blueshirts—but too late. . . . Fireworks explosion in India killed six, injured 22. . . . Richard Glade, 47, Jersey City fireman, was suffocated by smoke at coal and charcoal fire. . . . The worst drought experienced in a generation gave the Brothers of many States plenty to worry about.

Note to contributors: If you do not read your news contribution in the next issue of FIRE ENGINEERING don't despair —if it's suitable it will ultimately find its way into print.

Editor, Watch Desk.

WHAT DO YOU KNOW?

The Editor of "The Watch Desk" welcomes contributions from readers of FIRE ENGINEERING that briefly give facts about interesting, odd things that have to do with fires, fire fighting, etc. Address "Editor, Watch Desk."

Among the Fire Fans

By Otis Smith

GORDON MULLINS, the traveling buff, breezed through Baltimore recently, leaving the following news with this column. The Bell Club, 119 W. 33rd Street, Manhattan, has reduced the monthly dues from $2 to $1.50. Membership is also being limted to 50.

Robert Williamson, a Chicago fire fan, exhibited motion pictures of Chicago fires at a recent meeting of the Bell Club. We understand that Mr. Williamson is now in New England. More motion pictures are on the schedule for future meetings.

A word of advice to those who wrote to Mr. Mullins on his picture trade offer. Gordon is interested in trading first class photographs on fire subjects. He is not interested in buying or selling, or in pictures clipped from publications. While he was on the subject, Gordon mentioned that several persons wrote him for information on how to start a fire fan club. He will be glad to answer all such requests.

Another buff outfit heard from is Box 44 Association, Reading, Mass. Robert M. Graham, Engine 2 House, Woburn Street, writes that the club is over two years old and is limited to 25 active members. Club members aid the Reading Fire Department on an organized basis. At the annual meeting in July, club members operated a steam fire engine, the property of the local Chief. They will run this engine again, in the latter part of August at a Veteran Firemen's Outing.

Fireman Leslie Hoertsch, Kenosha, Wis., tells of the good work performed by fire fans at Racine, Wis., on July 26. The occasion was a $100,000 fire in the business district. The fire was fought from 9 to 3:30 the next morning. Civilians supplied the firemen with food and drink during that period.

Many thanks to the Phoenix Society for placing this column on the mailing list of their monthly paper. This fire fan club of San Francisco publishes an interesting little sheet, issued to the members, and gives the lowdown on the situation in San Francisco.

We note that Prof. Raymond C. Henry, well known buff of Troy, N. Y., has been doing graduate work in New York City this summer. We understand that Prof. Henry has photos of the interiors of all New York City fire stations. Prof. Henry was the organizer of Box 17 Club, of Albany. According to Secretary Paul A. Mooney, Box 17 has been rather inactive during the summer months, but will pick up in the fall of the year.

The Boston Sparks Association would be interested in joining with an association of buffs, or sparks as they are known in New England. There are quite a number of clubs in the Massachusetts area. They could form a very powerful association. Vincent Bolger says that the Sparks has received requests for further information on the pictures taken by the Boston Fire Department. These pictures are being taken with a motion picture camera, presented to the department by the Boston Sparks. The pictures are now the property of the department, so Mr. Bolger says that any further inquiries should be addressed to the Fire Commissioner.

Sparks General Order No. 9 lists three commendations. The first is for assistance rendered the Boston Fire Department Band by Spark Timothy G. Stillman. The second is to Spark Howard McClennan for assisting at a fire at Box 3411, in accordance with report from Capt. John Howard, of Engine 21. The third commendation is to Spark Francis M. Sweeney for assistance rendered the Somerville Fire Department at several alarms.

Fire Fan Edward H. Sprangers, 2228 W. Oakdale Street, Philadelphia, sent several photos of the coffee wagons of the Second Alarmers Association. We understand that the Second Alarmers are seeking funds to replace the two old trucks. These trucks are a good idea and should be adopted by more fire fan clubs. The trucks do not carry coffee alone, but also serve seltzer water, lime water, etc.

And while on the subject of photographs, we wish to thank the many buffs for their generosity in parting with their pictures. We have collected more than 200 photos during the few short months this column has been appearing. Several officers and men of the Baltimore Fire Department have seen this collection and have displayed keen interest over the various photos of apparatus, methods of fighting fire, and so forth.

W. A. McDonnell tells of the efforts of the St. Louis, Mo., Fire Department to organize a fire fan club in that city. In a way, this is a unique situation. Many departments frown on the humble buff, so it is indeed a pleasure to note that one Fire Department is actually endeavoring to organize the fans. It is reliably reported that Chief Cornoyer is 100 per cent behind this plan. Fire fans in the St. Louis area should get in touch with Mr. McDonnell at 4431a N. 19th Street, if interested in the idea of a club.

Speaking of the "younger-set" among the buffs, we hear from John S. Horner of 309 St. Mary Street, Burlington, N. J. Mr. Horner tells of the activities of his small group in aiding the city department. Says Mr. Horner, "Only two of our members are members of the regular department, because the rest of us aren't old enough. However we do our part by dragging hose and getting equipment for the regulars at a fire."

Jack McLachan, 932 W. 14th Avenue, Denver, Col., who is seventeen, would like to hear from others on how to organize a fire fan club.

Still another buff club heard from is the Mystic Sparks Club, Medford, Mass. Emmons E. Douglass says that the club meets twice monthly and that due are 25c a month. The members also study the department promotional courses. They would be interested in hearing from other sparks in their vicinity, 18 years and up or any age. Mr. Douglass may be reached at 33 Walnut Street, Medford, Mass.

The September issue of this column will close on August 30. Material received at Baltimore up to that date can be used in September.

Losses Reduced in Nashville

During the eight years that Luther Luton has served as city Fire Commissioner of Nashville, Tenn., the fire losses have been reduced from $1,357,000 to $167,000 for the past year. He has sponsored the development of the firemen's first aid corps, which has instructed more than 25,000 residents in first aid methods, and which has saved many lives.

Among Those Present at the Eastern Association of Fire Chiefs' Convention at Atlantic City, N. J.

Left to Right—Ex-Chief Geo. L. Mitchell, East Orange, N. J.; Chief F. M. Green, Morristown, N. J.; Asst. Chief Sam Cohen, East Orange, N. J., and Chief James T. Keegan, Salvage Corps, Newark, N. J.; Ex-Chief R. L. Smith and Sam Fink, of Pittsburgh, with Deputy Chief John T. J. Waldron, Vice-Pres., E. A. F. C.; A. M. Tarbert, Kerotest Co.; Miss Betty Phelan (sister of Chief Phelan of Pittsburgh), R. A. Cornwall, Kerotest Co., and Chief Phelan of Pittsburgh.

Manufacturers' Announcements

New Sales Manager for Atlas

The Atlas Fire Equipment Company announce a new director of sales, in the person of Arthur Myers. Mr. Myers will endeavor to pursue the "goodwill" sales policy of the organization, and direct it through the channels which will lead to extending greater service to all Fire Departments.

Arthur Myers

Mr. Myers has long been associated with the fire fighting world. Formerly promoting Gilson Fire Fighting Tools, he is well acquainted with the field of life saving. "To the many Fire Chiefs who realize the necessity of developing modern fire departments, his knowledge and data of life saving equipment, principally Atlas life saving nets and drill tower training nets, will be a great help," the Company states.

Thornton Tandem

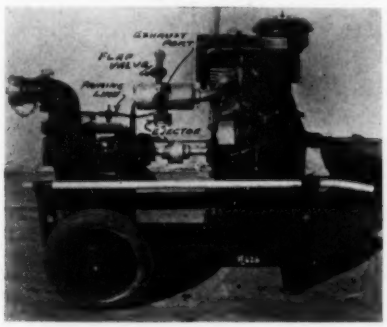
The Thornton Tamden Company, of Detroit, Mich., are builders of a four rear-wheel-drive unit, the purpose of which is to increase the carrying capacity of the unit to which it is applied. The manufacturers point out the following additional advantages of it on a truck: two rear driving axles; rim pull doubled; eight speeds forward and two reverse; reduced road impact; "walking beam" type dual spring assemblies giving maximum flexibility, permitting constant road contact; side-thrust evenly distributed and absorbed; load sway materially reduced.

The tandem unit is recommended for fire engines carrying a large supply of water for booster service.

New Primer for Centrifugal Pumps

A new priming device for the smaller sizes of centrifugal pumps has been developed recently by the Maxim Motor Company, of Middleboro, Mass. It employs the ejector principle, utilizing the force of the exhaust gas from the motor through a venturi tube to create a vacuum which lifts the water up to the pump.

The exhaust valve box of the primer is set into the engine exhaust pipe system, with a flap valve in the rear end to shut off the regular exhaust pipe and force the exhaust gases through the ejector orifice.



Primer for Centrifugal Pumps

To operate, the exhaust flap valve is closed by pulling up on the balled pull rod, and holding it in the pulled up position. Engine is accelerated to from 1,700 to 1,750 rpm. This forces the engine exhaust through the ejector. The ejector exhausts the air from the pump, creating a partial vacuum. Water is thus drawn up into the pump and the pump is thereby primed.

Dunn Secretary of Raybestos-Manhattan

William H. Dunn, Comptroller and Assistant Treasurer of Raybestos-Manhattan, Inc., was elected Secretary of that company to fill the vacancy caused by the death of Morton F. Judd.

Mr. Dunn, who is also a Director, came with the Manhattan Rubber Manufacturing Company in 1916 as Comptroller. The company then merged with the Raybestos Company, Bridgeport, Conn., and the United States Asbestos Company, Manheim, Pa., to form Raybestos-Manhattan, Inc., and become the Manhattan Rubber Manufacturing Division of that organization.

Mr. Dunn is also a Director and Treasurer of the Manhattan Securities Company which operates rubber plantations in Java. He will continue to have offices at the Passaic plant.

Remote Control on New Truck

Vacuum is employed in the controls of a new pumping engine recently delivered to Conneaut, Ohio.

The overhead carrier for the ladders is power operated by means of a vacuum mechanism, controlled by means of a conveniently located lever three inches long. By turning the lever a quarter turn, the ladder carrier can be raised or lowered. An indicator light located on the dash turns on with the ignition switch, in the event that the control is accidentally set in the lowering position. Manual operation is provided should the power hoist be inoperative.

In the same manner, the three discharge gates of the series parallel pump are operated, all by remote control with small quarter turn levers placed in a row on the operators side of the six man cab. It is possible to open or close these gates at 110 pounds pressure.

As in the case of the master control valve making possible series parallel operation, again the small quarter turn lever actuates this unit.

A separate suction manifold, suitable for connecting 2½-inch lines from hydrant to pump, is likewise controlled by vacuum. The engine was built by the Hanley Engineering Service, Prospect, Ohio.

Portable Electric Plants

United States Motors Corporation, Oshkosh, Wis., has issued an illustrated folder showing portable electric plants suitable for Fire Department use. The models illustrated range in capacity from 400 watts to 25,000 watts.

Atlas Nets for New York

New York City has just specified eight Atlas life nets for new fire trucks being installed. Atlas drill nets are also used by the Fire Department drill school.

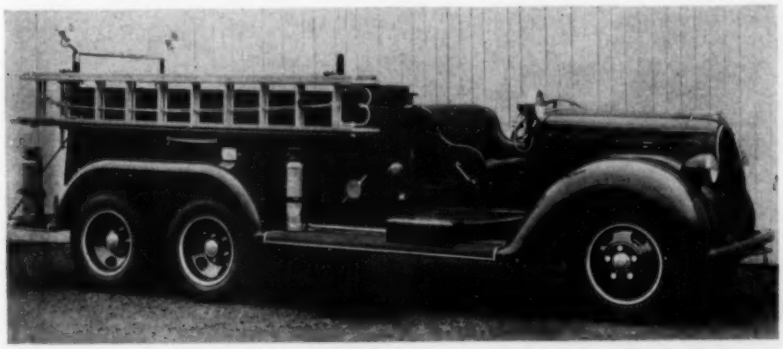
Chief Noonan, Vallejo, Retires

D. J. Noonan, Chief, Vallejo, Cal., retired on July 1, after serving as a member of the department for 45 years. He was Chief for the past 20 years.

Fights Fire, Minus Pants

Clothes may make the man, but not the fireman, Henry Bosmans, a member of the New Haven, Conn., Fire Department, demonstrated recently when sans pants, he helped subdue a blaze.

The "night hitch" all firemen keep handy for night alarms, was missing from Bosmans' place alongside his bed in the bunkroom when a 3 a. m. alarm summoned his engine company. But Bosmans jumped aboard the apparatus clad only in coat and underwear. His unconventional attire was no hindrance to Bosmans, as he helped fight a fire in a two-story brick building.



Thornton Tandem Applied to Triple Combination Fire Engine; 350 Gallons of Water Carried

Convention Dates

Aug. 7-12 — WESTERN PENNSYLVANIA FIREMEN'S ASSOCIATION. Annual Convention, Ellwood City, Pa. Secretary, Convention Committee, R. L. Bates, Ellwood City.

Aug. 10—MID-HUDSON-HARLEM VALLEY FIRE CHIEFS' ASSOCIATION. Next Meeting Dover Plains, N. Y., at 8 p.m. Secretary, Chief H. F. Drake, Clinton Corners, N. Y.

Aug. 14—NORTHEAST NEBRASKA FIREMEN'S ASSOCIATION. 14th Annual Convention, Ponca, Neb. Secretary-Treasurer, Verner P. Fischer, Wakefield, Neb.

Aug. 15-16—TRI-STATE FIREMEN'S ASSOCIATION. Annual Convention, Gallup, N. M. Secretary-Treasurer, S. E. Brentari, Gallup.

Aug. 15-17—MICHIGAN STATE FIRE CHIEFS' ASSOCIATION. 14th Annual Conference, Bay City, Mich. Secretary, Chief George F. Dansbury, Grosse Pointe Farms, Mich.

Aug. 15-18—FIREMEN'S ASSOCIATION OF THE STATE OF NEW YORK. 67th Annual Convention, Tournament and Parade, at New York World's Fair, New York City. Secretary, Fred A. Davis, Fort Edward, N. Y.

Aug. 15-18—GREAT LAKES FIRE CHIEFS' ASSOCIATION and MICHIGAN FIRE CHIEFS ASSOCIATION. Joint Meeting, Wenona Hotel, Bay City, Mich. (14th Annual Convention, Michigan Chiefs.) Secretary, Great Lakes, Chief R. E. Mottesheard, 4501 Schaeffer Rd., Dearborn, Mich.; Michigan Chiefs, George F. Densbury, Grosse Pointe Farms, Mich.

Aug. 18-19—CONNECTICUT STATE FIREMEN'S ASSOCIATION. 56th Annual Convention, Pleasure Beach, Bridgeport, Conn. Secretary, D. W. Harford, 10 Chestnut St., South Norwalk, Conn.

Aug. 21-24—DOMINION ASSOCIATION OF FIRE CHIEFS. 31st Annual Convention, St. Thomas, Ont. Secretary, Chief James Armstrong, Fire Department, Kingston, Ont.

*Sept. 5-7—KENTUCKY FIREMEN'S ASSOCIATION. 20th Annual Convention, Henderson, Ky. Secretary, Captain V. A. Beam, 2215 W. Broadway, Louisville, Ky.

Sept. 5-7 — MARYLAND SHORT COURSE FOR FIREMEN. 10th Annual Short Course, University of Maryland, College Park, Md. Director, Chief J. W. Just, College of Engineering, the University.

*Sept. 6-8—INDIANA FIRE CHIEFS' ASSOCIATION. 13th Annual Convention, Terre Haute House, Terre Haute, Ind. Secretary, Archie McCabe, Muncie, Ind.

*Sept. 11-14—COLORADO STATE FIREMEN'S ASSOCIATION. 28th Annual Convention, Tournament and Fire College, Longmont, Col. Secretary, Clinton Turnbull, 215 Boston Bldg., Denver, Col.

Sept. 14-16—LOUISIANA STATE FIREMEN'S ASSOCIATION. 34th Annual Convention, Evangeline Hotel, Lafayette, La. Secretary, Edward Wright, Houma, La.

Sept. 18-19—PACIFIC COAST ASSOCIATION OF FIRE CHIEFS. 46th Annual Convention, San Francisco, Cal. Secretary, Jay W. Stevens, State Fire Marshal, Merchants Building, San Francisco, Cal.

Sept. 19—NEW HAMPSHIRE STATE PERMANENT FIREMEN'S ASSOCIATION. Regular Meeting, location to be specified by President. Secretary-Treasurer, Tom L. Kellogg, Box 714, Manchester, N. H.

Sept. 20-23—INTERNATIONAL ASSOCIATION OF FIRE CHIEFS. 67th Annual Conference, Empire Hotel, San Francisco, Cal. Exhibits and Meetings, Municipal Auditoruim. Secretary-Treasurer, Ex-Chief James J. Mulcahey, 16 Franklin Ave., Yonkers, N. Y.

Sept. 26—FAIRFIELD COUNTY FIRE CHIEFS' EMERGENCY PLAN. Next Meeting, New Fairfield, Conn. Secretary, Captain John Moehring, Toms Road, Stamford, Conn.

Sept. 25-28—CALIFORNIA STATE FIREMEN'S ASSOCIATION, 17th Annual Convention, Monterey, Cal. Secretary-Treasurer, Harry E. Strasser, P. O. Box 513, Beaumont, Cal.

October, 1939—ARKANSAS STATE FIREMEN'S ASSOCIATION. 18th Annual Convention, Eureka Springs, Ark. (Exact date to be announced later.) Secretary-Treasurer, H. D. Compton, Little Rock, Ark.

Oct. 2-5—FIREMEN'S ASSOCIATION OF THE STATE OF PENNSYLVANIA. 60th Annual Convention, Erie, Pa. Secretary, Chief Charles E. Clark, Box 217, Wayne, Pa.

Oct. 3-6—KANSAS FIRE COLLEGE. Annual Fire College, University of Kansas, Lawrence. Director, Fire College, Dean, Harold G. Ingham, University.

Oct. 4-6—TENNESSEE FIREMEN'S ASSOCIATION. 9th Annual Convention, Jackson, Tenn. Secretary-Treasurer, Joe J. Martin, Nashville, Tenn.

Oct. 9-12 — INTERNATIONAL MUNICIPAL SIGNAL ASSOCIATION. 44th Annual Convention, Biltmore Hotel, Providence, R. I. Secretary, Irvin Shulsinger, 7 East 42nd St., New York City.

Oct. 16-18—SOUTHWESTERN ASSOCIATION OF FIRE CHIEFS. 30th Annual Convention, Dallas, Texas. Secretary-Treasurer, Chief J. Ray Pence, Stillwater, Okla.

Oct. 16-21—ALABAMA STATE FIREMEN'S ASSOCIATION. 4th Annual Convention and Fire College, Florence, Ala. Secretary, George E. Crossett, 1916 Sixth Ave., North, Birmingham, Ala.

Oct. 17-19—ILLINOIS FIREMEN'S ASSOCIATION. 52nd Annual Convention, Kankakee, Ill. Secretary, Asst. Chief Roy W. Alsip, Champaign, Ill.

Oct. 17-19—NEBRASKA STATE VOLUNTEER FIREMEN'S ASSOCIATION. 58th Annual Convention, Kearney, Neb. Secretary-Treasurer, Louis A. Novak, Norfolk, Neb.

Oct. 18—FIRE CHIEFS' EMERGENCY PLAN of Westchester County. Next Meeting, Mamaroneck, N. Y. Secretary, Capt. Howard Gear, Fire Headquarters, Rye, N. Y.

Oct. 24-25—INDIANA ANNUAL STATE FIRE SCHOOL. 6th Annual School, Purdue University, Lafayette, Ind. Director of Education, Emmett T. Cox, Fire Marshal's Department, State House, Indianapolis, Ind.

May 21-24, 1940—IOWA FIRE SCHOOL. 16th Annual Fire School, Iowa State College, Ames, Ia. Director of College, Prof. Lindon J. Murphy, University.

May 25, 1940—IOWA FIRE CHIEFS' ASSOCIATION. 12th Annual Meeting, Ames, Ia. Secretary-Treasurer, Chief L. R. Morris, Ames.

*The notices marked with an asterisk are either appearing for the first time or have been changed since the preceding issue.

Arizona State Firemen Meet

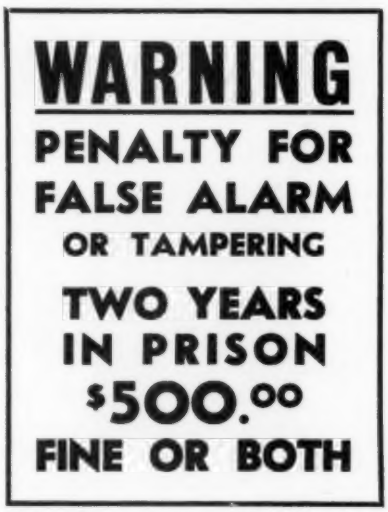
The 16th annual convention of the Arizona State Firemen's Association was held at Winslow, Ariz., on June 14 to 17. The officers elected were as follows:

President, F. E. Porter, Fire Department, Phoenix; First Vice-President, John J. Curry, Tempe; Second Vice-President, P. Brindley, Oatman; Secretary-Treasurer, H. W. Reggin, Box 813, Prescott; Executive Committee, W. B. Fleming, Williams; Frank Porter, Kingman; R. J. Graham, Miami, and George Robinson, Yuma.

Warnings Placed on Fire Alarm Boxes

On each side of every fire alarm box in Boston, has been placed a decalcomania label, as illustrated, warning of the penalty for turning in a false alarm. This is another step, in conjunction with the gradual installation of sirens on fire alarm boxes, to curb false alarms.

The idea of the labels is so well thought of by the neighboring towns, that the same kind of notices have been ordered by Everett, Quincy, Newton, Cambridge, Belmont, Watertown, Wal-



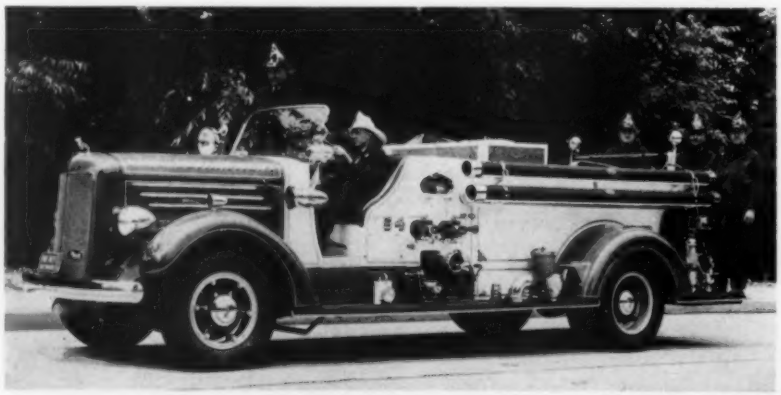
Notice Placed on Sides of Fire Alarm Boxes

tham, Needham, Wellesley, Athol, Gloucester, Pittsfield, Holyoke, Danvers and Medford, Mass. The same kind of warning notice will be placed on all boxes in Greater Boston.

Boston Campaign Brings Results

Arthur Reilly, Fire Commissioner, Boston, Mass., reports results of the city's campaign against false alarms. This year, on the night before the Fourth of July, there was but one false alarm and for July 3 and 4, only eight alarms were turned in.

The city has placed sirens on its "bad" boxes and warning notices regarding a fine and prison for false alarm offenders on all the boxes. Mr. Reilly believes that these steps have been productive of results.



Fire Apparatus That Will Make Coast to Coast Run

Arthur B. Hickox, the "Wild Bill" of early automobile racing days, will drive the Mack pumper shown from the New York World's Fair to the Golden Gate International Exposition in San Francisco, in the interests of fire prevention. Mr. Hickox is shown at the wheel.

WHEN STEEL BARS THE WAY TO EFFECTIVE FIRE FIGHTING

KEROTEST EMERGENCY CUTTING EQUIPMENT

You can get at the source of a fire in a fraction of the time ordinarily required with the aid of this compact and completely self-contained Kerotest acetylene cutting apparatus. Worn like a vest, it enables a fireman to quickly and efficiently cut steel shutters, cellar doors, etc., in a fraction of the time ordinarily required. Investigate its remarkable advantages. Send for descriptive Bulletin.

KEROTEST MANUFACTURING COMPANY
PITTSBURGH, PA.

KEROTEST

When you can't

PREVENT FIRES

YOU CAN PREVENT MANY MINOR FIRES FROM BECOMING DISASTERS

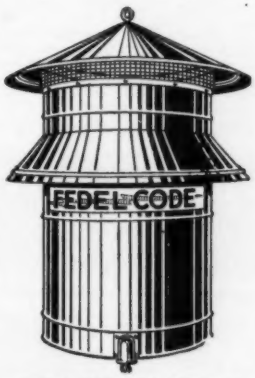
BE PREPARED!

ASSURE PROMPT RESPONSE TO ALARMS

with a dependable

FEDERAL VERTICAL SIREN

Federal Weather-proof Vertical Sirens — Powerful — Dependable



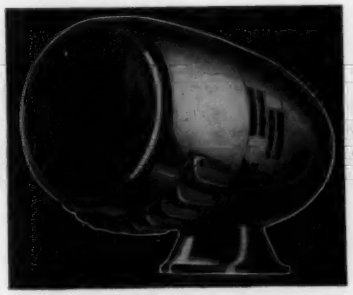
Maximum Sound Volume Radiated Equally in all Directions

WRITE FOR BULLETIN 63

GET THERE SWIFTLY—SAFELY!!

A PROMPT ARRIVAL WINS HALF THE BATTLE!!

The Federal 77 Siren with Flashing Red Light



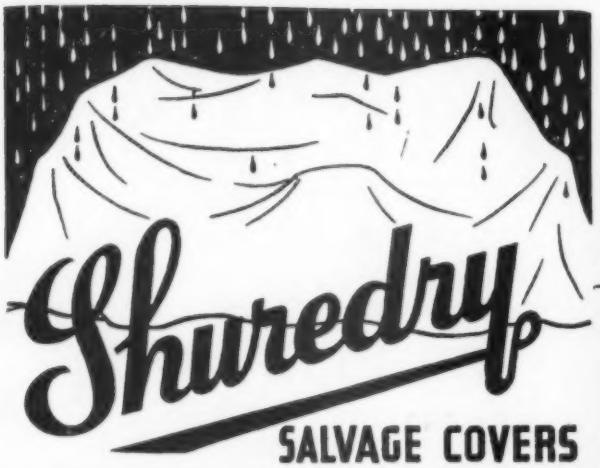
Visible and Audible Protection Coasts for more than two minutes.

ASK FOR BULLETIN 61

LET FEDERAL COASTER SIRENS CLEAR YOUR WAY THROUGH TRAFFIC

Where lives and property are at stake Nothing but the best is good enough!!

FEDERAL ELECTRIC CO.
8702 SOUTH STATE STREET CHICAGO, ILLINOIS



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For Midship Mounting—Specify
BARTON-AMERICAN
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FIRE APPARATUS PUMP

This pump has no equal for HIGH PRESSURES and LARGE CAPACITIES at SLOW MOTOR SPEED.

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AMERICAN-MARSH PUMPS INC.
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Pumps and Pumps Only Since 1873

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PROMOTIONAL STUDY COURSE

Herein is presented a series of definitions, questions and answers designed to aid fire department officers in preparing themselves for promotional examinations. In this department, which appears monthly, will be included questions typical of examinations held throughout the country.

Definitions

Strut: A prop; the piece that sustains compression.

Summer: A large piece of timber supported by piers or posts; when it supports a wall it is called a brest-summer or bressummer.

Sump (or Sumpt): A low enclosure or pit to catch waste liquids.

Tell-Tale: An electrical mechanism, by means of which a test can be made to determine whether the water in the gravity and pressure tanks is high or low. (Not always reliable.)

Terra-Cotta: A fine quality of clay. (The highly ornamental terra-cotta fronts of buildings are easily damaged by fire.)

Texas: A large frame roof structure or room, smaller in area than the roof itself, having one or more stories in it. (Sometimes called a lantern skylight.)

Questions

(To be answered in next issue)

1. Describe the methods you would recommend to prevent fires and to safeguard lives in (a) Schools; (b) Department stores.
2. You are directed to inspect a three-story brick building used for woodworking purposes. State the particular fire hazard attached to this line of business, and what inspection you would make.

False and True Questions

(Is Each Question False or True? Answers in Next Issue)

3. T F—Layers of fire-foam are likely to be of shorter duration in fire extinguishing effect than are the wetting effects of other types of extinguishers.
4. T F—Gas from carbon dioxide extinguishers often penetrates to levels which would be impossible to reach with other types of commonly used extinguishers.
5. T F—Standpipes produce less friction loss than do hose lines inside a building.
6. T F—Fireboats are frequently used to tow burning vessels from one point to another.
7. T F—Salvage covers used on floors and stairways should always be left the longest and should only be picked up after all other work is done.
8. T F—Poor maintenance of apparatus and quarters is detrimental to the efficiency of the department and makes a poor impression on the public.
9. T F—Incendiarism should be especially looked for at fires in schools.
10. T F—Draughts at fires do not carry away the extinguishing element produced by foam type extinguisher.
11. T F—Good ventilation does much to extend the life of interior standpipe hose by reason of its preventing mildew.
12. T F—Open type sprinklers employed to produce water curtains are so arranged as to cover the entire window area with a sheet of water.
13. T F—Fires are sometimes communicated to adjacent wharves by drifting of burning debris.
14. T F—Due to possible loss of life and destruction of property, an efficient fire alarm system might be reckoned the most important of all protection equipment.
15. T F—Perfect co-operation is necessary between officers and members for efficient management and maintenance of quarters.
16. T F—Incendiary fires are of fairly frequent occurrence in penal institutions.
17. T F—Fire foam coats burning substances whether they are liquid or solid.
18. T F—An excess amount of bicarbonate of soda in extinguishers tends to produce greater pressure, and to prove injurious to materials struck with the stream.
19. T F—A considerable volume of water, under good pressure, is essential for the efficient operation of open type sprinklers.

Completion Statements

20. Fires are always possible in fireproof buildings, because of .....
21. Poor concrete when exposed to intense fire may .....
22. Steel and iron when exposed to rapidly changing temperature at a fire are apt to .....
23. Cement and stone when exposed to a hot fire are apt to .....

Answers to Questions in Previous Lesson

1. (a) Hazards in connection with fires in grain elevators are: possibility of explosion due to disturbing dusts located on rafters, beams, and other points of repose; absorption of great quantities of water by grain stored in elevators, and bursting of elevator bins thereby; explosion of dust already suspended in the air; possibility of collapse of elevators due to weight of water discharged into bins; heavy, acrid smoke created by burning grain; hazard incidental to getting streams into bins in grain elevators. Due to the height of these bins, it is usually necessary to operate from the top, and in reaching the top men are placed in a dangerous position.

(b) Hazards incidental to fires in candy factories are: possibility of explosion of inflammable dusts, such as powdered sugar, corn starch, flour and other similar materials; pungent smoke thrown off in burning of materials employed in making candy; presence of inflammable volatiles used in connection with flavoring extracts; inferior construction commonly found in connection with candy factories; presence of great quantities of highly combustible packing materials, such as paper boxes, wooden boxes, wrapping paper, oiled paper, etc., which create intense heat, burn rapidly, and also generate acrid smoke. In large candy factories, where chocolate is manufactured complete, including the grinding of raw materials, heavy machinery is likely to be encountered, and this adds a serious hazard, particularly where the building is not of modern construction, and where floor beams may be seriously weakened by fire beneath them. The life hazard in connection with candy factories is serious, due to the large number of employees found in such establishments.

2. (a) Dangers to be guarded against while fighting a fire involving wool include: dense smoke; absorption by wool of large quantities of water, which might over-weight the floors and cause their collapse; possibility of bales of wool absorbing water, swelling and bursting. If wool is tightly stored on a floor, and the bales swell upon being wetted, there is a possibility of walls being forced outward and floor beams displaced, with the result that the floor will collapse.

(b) Dangers to be guarded against in fires involving ammonia are: asphyxia of men; explosion of ammonia vapor when mixed with air; leakage of ammonia from cisterns, endangering occupants of buildings in the immediate neighborhood.

(c) Oils are non-explosive, but that does not mean they are non-combustible. Few oils are explosive, when in liquid form. When they are vaporized, they are no longer oils, although the vapor may be highly inflammable. Dangers to be guarded against while fighting fire involving such oils are: explosion of inflammable vapors; overflow of oils, or spattering due to directing streams into vats containing such oils when afire; toxic fumes given off by oil; dense smoke created by burning oil; rupture of oil containers, spreading fire over large area and endangering men.

3. True; 4. True; 5. True; 6. True; 7. False; 8. True; 9. True; 10. True; 11. True; 12. True; 13. True; 14. True; 15. False; 16. True; 17. True; 18. True; 19. True.

20. . . . dead-lights.
21. . . . relief valve.
22. . . . 160. . . .
23. . . . striking ground.

Laundry Truck for Cleveland

The Cleveland Fire Department has a new "laundry" truck. It is a Ford panel, painted red, and is used to pick up and deliver sheets, towels and other linen used by the city's various firehouses. The panel is standard in every respect except for a siren. This is installed for emergency use, such as rushing oxygen or first aid supplies to persons overcome by smoke. The truck is also used for delivering department supplies, tires and other items to firehouses.

Questions and Answers

NOTE—Readers are invited to send in questions, which will be answered in the order received. Names are omitted from questions unless otherwise specified

Nozzle Pressure

To the Editor:

A high pressure gauge and a line of hose are connected to a high pressure hydrant. The line is taken to the roof of a 50-foot building. The line is first fully charged and then the nozzle is shut. The high pressure gauge reads 125 pounds. What is the pressure at the nozzle? P. W.

Answer: As there is no flow through the line when the nozzle is closed, there will be no friction loss. The pressure at the nozzle will thus be the pressure at the hydrant, minus the back pressure (static pressure), represented by the elevation of the nozzle above the hydrant.

The height of the building is 50 feet and the back pressure is therefore 50 x .434, or 21.7 pounds. The pressure at the nozzle will be 125 — 21.7, or 103.3 pounds

Incidentally, the height of the gauge above the ground, which would possibly be two or three feet, is not taken into account in the solution, for it represents a negligible factor.

Protection Against Gases and Fumes

To the Editor:

What gases and fumes with which a fireman may come in contact require body protection other than that offered by gas masks? W. F. B.

Answer: New York and some of the other large cities provide firemen with wading trousers as a protection against certain corrosive fumes or gases encountered at fires.

Ammonia, nitric acid and chlorine are particularly vigorous in their attack and protection should be provided against them.

Ammonia seems to have the worst effect, however, and it was due to the presence of ammonia fumes at many fires that resulted in the development of wading trousers for the men in the fire service.

Discharge Formula, etc.

To the Editor:

In the formula $N^2 \times BP \times \sqrt{NP}$, why is N^2 multiplied by 30?

In the formula for obtaining the nozzle pressure when the length of hose in line, size of hose in line and nozzle and the engine pressure or hydrant pressure is given, why is 1.1 used as a factor? (N. P. = E. P. ÷ 1.1 + KL). What is the method used to arrive at the figure quoted as a constant?

Is friction loss greater in hose laid horizontally or vertically?

What are the contents in gallons of a 50-foot length of 2½-inch hose; and of 3-inch hose?

What is the weight of water per 50 foot length in a charged line?

A town has a 1¼-inch water line that runs out to a mill. They shut this line off in freezing weather. Would the 1¼-inch water line be sufficient to satisfactorily feed a 2½-inch fire hose line? J. H. G.

Answer: The formula which you give ($N^2 \times BP \times \sqrt{NP}$) is nothing more than the old discharge formula, which is commonly written as follows:

Discharge in gallons per minute = $29.7\ d^2 \times \sqrt{P}$.

The BP used in the formula you give apparently indicates barometric pressure. However, the figure 29.7 has nothing whatsoever to do with barometric pressure. It is secured by combining certain factors in order to get the answer to the problem in gallons per minute.

To explain the derivation of 29.7, the following is given:

The theoretical velocity of discharge is $V = \sqrt{2gh}$, where "h" is the head in feet creating the pressure, and "g", the acceleration due to the force of gravity. It is best to get "h" in terms of pounds instead of feet, for practically all gauges in everyday service record in pounds instead of feet. If h = head in feet, $\frac{h}{2.304}$ = p, the pressure in pounds. By transposing the denominator in the above equation to the opposite side of the equation, $h = 2.304p$. Using the value of h in the formula for the theoretical velocity, the equation is $v = \sqrt{2 \times 32 \times 2.304p} = 12.14\sqrt{p}$ feet per second. The discharge $Q = Av = A \times 12.14\sqrt{p}$. This gives the discharge in cubic feet per second, where the area is in square feet and the velocity in feet per second. To get the discharge in gallons per minute it is either necessary to have the velocity in feet per minute and area in square feet and multiply the answer by 7.481, the number of gallons in a cubic foot, or else have the area in square inches and velocity in inches per minute and divide the answer by 231, the number of cubic inches in a gallon. If the measurements were in feet, the formula would be Q (in gallons per minute) = $\frac{.7854\ d^2}{144} \times 60 \times 12.14\sqrt{p} \times 7.481$, where d is the diameter in inches. The diameter squared multiplied by .7854 gives the area of the nozzle. In the above, if the diameter is in inches, then the area will be in square inches, and it is necessary to divide the area in square inches by 144, the number of square inches in a square foot, to secure the area of the nozzle in square feet. This explains the figure 144 in the equation. The velocity secured with the formula is in feet per second and must be multiplied by 60 to get the velocity in feet per minute, as shown in the equation. The 7.481 is the number of gallons in a cubic foot and changes the value of Q from cubic feet per minute to gallons per minute. This equation for Q solves down to $Q = 29.72d^2\sqrt{p}$.

The above calculation also shows why n^2 (nozzle diameter squared) is used (d^2 in the formula).

29.7 is a comparatively accurate value for the figure in the formula, although 30 is quite frequently used. Possibly the use of the 30 has confused some student into believing that it represents barometric pressure.

In regard to the factor 1.1 in the formula for finding nozzle or engine pressure, these formulas are empirical formulas and are designed to give results which tally with experimental figures. Any other figure than 1.1 could be used if it would give more accurate results in the formula. It just so happens that this figure 1.1 is needed in the formula to give fairly accurate results, and which should tally with experimental figures.

Incidentally, in solving for nozzle pressure and engine pressure on small diameter lines of hose, with small nozzles, the value 1 is used in place of 1.1, as it gives results which tally more closely with test figures.

With reference to friction loss in hose laid horizontally and vertically, it is precisely the same where the flow is the same. Of course, where hose is laid vertically, there will be a static head which must be overcome, but this has nothing to do with friction loss.

The contents of a 50-foot section of 2½-inch hose fully charged is 12.737 gallons. At 8.35 pounds per gallon, this represents 106.354 pounds.

The contents of a 50-foot section of 3-inch hose fully charged is 18.262 gallons, which at 8.35 pounds per gallon represents 153.32 pounds.

With reference to the question regarding a 1¼-inch water line, we may say that such a line for fire fighting purposes would be practically worthless. You can appreciate this better when you review the following data:

If a ½-inch nozzle were used on the hose fed by the pipe line, and the nozzle pressure were 30 pounds, discharge would be approximately 40 gallons per minute. With this discharge the friction loss would be 9.2 pounds per hundred feet of pipe.

But such a nozzle is far too small for practical operation in factory fire fighting. If a ⅝-inch nozzle were employed and the nozzle pressure were 30 pounds,

ALUMINUM LADDERS *Make News* IN PRINCETON, ILLINOIS

Bureau County Republican
PRINCETON, ILLINOIS, THURSDAY, APRIL 13, 1939
FIRE TRUCK UNDERGOES TESTS
New Fire Truck Displayed
MANY FIREMEN ATTEND TESTS AT LOCAL PARK

When this 36½-ft. quadruple ladder truck was delivered to Chief James Moran of the Princeton (Illinois) Fire Department by National Fire Apparatus Co. last spring, it rated headline news and columns of type in the *Bureau County Republican*. In reporting the Aluminum Ladders installed on this truck, the lead article says:

"The truck . . . is equipped with 240 ft. of ladders made of aluminum, which weighs only 3½ lbs. per ft., the old type ladders weighing over double this amount. . . . Aluminum is considered also to be better due to the fact that it is fireproof and saves manpower in erecting them, allowing the firemen to go on about their other duties. Two to three men can handle the new ladder while five to six were necessary before."

STRONG • • • DURABLE • • • LIGHT

It may be added that Aluminum Ladders are twice as strong as ordinary ladders and require no painting or other upkeep. When ordering be sure to specify aluminum ladders manufactured by the Aluminum Ladder Company—they are the lightest on the market today.

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Manufacturers of a Complete Line of Quality Firemen's Clothing

SCIENCE TAKES UP ARMS AGAINST ASPHYXIAL DEATH!

According to the Society for the Prevention of Asphyxial Death (SPAD), sponsored by the American Medical Association, ASPHYXIA exacts a toll of 1000 lives each week, twice the number lost in automobile accidents.

Branding the nation's annual 50,000 deaths from asphyxiation as tantamount to "a national emergency," medical authorities and life-saving organizations are taking definite steps to reduce this toll and further safe-guard life.

Rapidly proving its true worth in combating all forms of asphyxia, the combination

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RESUSCITATOR • INHALATOR • ASPIRATOR

has been selected to meet this emergency in hundreds of hospitals, fire departments, beaches, industrials, etc. Artificial respiration is made comparatively easy and highly effective.

(Approved by the Council on Physical Therapy of The American Medical Association)

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STERLING

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—it oscillates

No Exposed Wiring

and its powerful, flashing warning helps clear the way. Trouble-proof because operating mechanism is enclosed within the body. Brackets furnished for either top or fender mounting.

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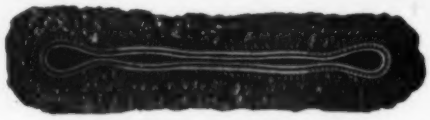
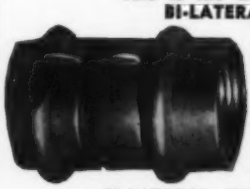


This is the new LIGHT WEIGHT BI-LATERAL FIRE HOSE



This hose will stand 900 pounds pressure and weighs but 45 pounds to the section uncoupled.

Here's the new DROP-FORGED rocker lug coupling (not cast bronze), with the swivel-protecting feature.

This coupling will stand several expansions and can be used over and over again, saving your city at least 20c to 30c per foot on future hose purchases.

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COMFORTABLE AS YOUR OLD FELT HAT: WON'T SHAKE OFF

Never go to a fire without the protection of a good helmet. It may save your life.

DESIGN - - MATERIALS - - CONSTRUCTION
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Carry It in Pocket. Slip on in a Jiffy. Positive Protection to Eyes Against Smoke and saves the lungs.

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Wax Treated - Solid Multiple Woven
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Manufactured by
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"Territories Available"

CRACKERJACK FIRE HOSE

The hose with an unsurpassed reputation for QUALITY and SERVICE that has made it the STANDARD OF THE WEST for over 25 years.

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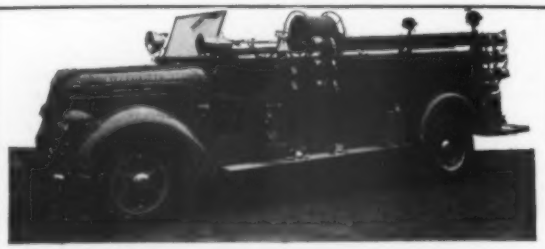

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The SEALAND CORPORATION
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the discharge would be 64.5 pounds and the friction loss per hundred feet of pipe, 23 pounds.

If we used a 1-inch nozzle at 30 pounds, which is considered about the minimum that can be employed with effect, the discharge would be 162 gallons per minute, and the friction loss in the pipe line would be 241 pounds per hundred feet.

Evidently if the line is of any length whatsoever, it would be a physical impossibility to provide sufficient pressure to deliver enough water to the line to supply a one-inch nozzle at 30 pounds pressure.

By William Paul Babcock

"Eureka!"

NO, that heading is not intended to advertise any brand of fire-fighting material.

What bright little scholar knows which famous scientist used that exclamation and under what circumstances?

Right, Roi Woolley, it was the Greek scientist, Archimedes, who had been ordered by his king to ascertain whether the smithy had made the crown of pure gold, or of some alloy with cheaper metal. Sitting in his bath, his body caused an overflow of water and this reminded him that the way to test the amount of gold in the crown was to see how much water it would displace and compare the latter with the amount displaced by a like weight of pure gold. Having made this discovery, he ran naked down the streets, shouting "EUREKA!" which, being interpreted, means "I have found it!" and has since become an exclamation of victory or discovery.

All right, you Californians, you may now speak up and say it is the motto of your great state, resulting from the discovery of silver there.

But what I am trying to put across to you is that I have discovered a way to make readers write in to me about their experiences and reactions to this column. Of course this is something that has been known by veteran writers for ages, but me, I have only just discovered it.

All I have to do, apparently, is to make a mistake.

How do I know?

Well, I never got any official response to my appeals for information about the discontinuance of the Minneapolis Salvage Corps, but when I wrote what little gossip I could pick up from among the neighbors out there, I promptly get a letter from Captain A. M. Griesgraber (not, incidentally, otherwise identified as to whether of the Salvage Corps or of the F. D., nor whether active or retired). The good Captain tells me that I am "all wet—said in the vernacular." Says he, Chief Trager, of the Mpls. F. D., refused to take over the personnel and equipment in toto, but did take over the covers and duties. Well, that was all I thought I was saying, but it makes little difference; what I was trying to bring out was that here is another Fire Department doing salvage work and not relying on the Underwriters.

I am grateful to Capt. G. for some interesting details on how they will carry on. He says the covers are spread around on all the trucks in the F. D., and when two engine companies roll in on a call, the *second* due does the salvage work; when three engine companies are called on first alarm, the *third* one covers up. If two engine companies go to work, special call or multiple alarm is used by Battalion Chief. One downtown company takes care of *all washing, drying* and storage of covers. Evidently some of the Patrol rolling stock is maintained in running order, for he says if needed, the "Patrol which carries 27 covers" is sent after by orders, or "manned by placing another company out of service."

The good Captain does not look far enough ahead, for he openly asserts that he feels the insurance companies are the gainers. Suppose, captain, you come through with some statistics to support your contention. This is still a free country, sans Hitler, Mussolini, Stalin, et al, and you have a perfect right to your opinions. And, if they are founded on fact, they are valuable to your buddies.

Goodness knows, I've often stated I don't know all about this subject. I also have disclaimed, properly, any even remote connection with fire insurance interests. But as one who has, as a *volunteer* fireman, practised salvage work for over 20 years, I declare I *know* and can *prove* that in the *majority* of fires and other emergencies, it benefits the owner and/or occupant of a building either *solely* or at least *more* than it does the insurance interests, allowing as how at least 75 per cent of damage in all fires is by water.

Evidently the good captain has not been reading my column very long or very carefully either, or he would have known all my timeworn arguments, but I am perfectly willing to open these lines to him and his Chief and any other officials of the city and debate with him or them the question, *"Does salvage work performed by the Minneapolis Fire Department benefit the insurance companies more than the citizens of the city?"*

And if I had spare cash I'd be glad to put up good stakes and make a wager that I could prove my points and the Captain would lose.

But probably this bout will be called off on account of wet grounds, or something, so I here declare that if we are alive one year from this date, I shall expect that Captain Griesgraber will voluntarily write me, giving a full account of the fires whereat salvage work was necessary, listing the amount of insurance carried by *occupancy alone,* in each case, the number of covers spread thereat and the estimated amount of property *saved* from water damage. I shall also expect him to state whether, as a result of this service, tenants were enabled to resume business as usual, either on same or another location, *but using same merchandise and/or machinery.* And in event of the latter being true, I shall expect a report on the *profits saved* as a result of this service.

When the good Captain wakes up and learns how many Chiefs in cities and villages and hamlets throughout the length and breadth of this promised land are *voluntarily* taking on salvage work—well, "fifty million *firemen* can't be wrong."

* * *

Gee, had a nice letter from G. C. Gunn, of Wythe District Rescue Squad of Hampton, Va., who is a veteran reader of this column and is interested in salvage and emergency work. If you boys have any ideas on equipment and operations send 'em along to C. G., they are building and equipping their own little rig and deserve much credit. I hope to meet him and others of the Virginia State Association of Rescue Squads at their convention in Alexandria, September 29-30, where I have been invited because of my office as Secretary of the Rockland County Emergency & First Aid Council, Inc., thanks to J. Russell Hitt, Secretary of Convention Committee.

* * *

Say, do you remember the Emergency Blanket Fold outlined and described in these pages 'way back in 1937? Well, when lecturing recently before the Guards Training School of the New York State Department of Correction, I demonstrated this emergency feature and it was much appreciated by Harold L. Briggs, Assistant Director of Education, in charge of the school. He thought so much of it he has revised the diagram and text to make it much more understandable, and has instructed that every penal institution fold emergency blankets in this manner.

Fire Destroys Canning Plant

Fanned by a strong wind, fire within a few hours razed a three-story canning plant and warehouse at South Superior, Mich., and caused a loss estimated at $500,000.

The fire was out of control before the Fire Department arrived, and the men were hampered by a poor water supply. Only one four-inch main was available. It was necessary to stretch lines about 1,000 feet long.

Three firemen who climbed to a ledge fourteen feet above the ground, were buried in a shower of bricks, when the wall collapsed.

Fight Fire in Clay Mines

The Georgia Kaolin Mine, near Macon, Ga., is considered to be one of the largest clay producing plants, and is valued at more than $1,000,000. Fire broke out at 8 p.m., and a call sent to Macon. A pumper made the 13 mile run.

Upon arriving at the fire, it was noted that the only water for fire-fighting was a pool containing a mixture of clay and water. This was used and proved effective in extinguishing the flames. The pumper worked for 29 hours.

A six-story building, consisting of corrugated sheet metal and wooden frame and elevator shaft, was consumed, but other parts of the property were saved. The men worked under hazardous conditions because of the building and elevator beams.

FALSE ALARMS

"I can't for the life of me see what Doc meant when he said a reducer would help me take off weight."

SURGICAL WORK

Memorial Day in a village is something not to be slighted. During the day a parade was held, followed by a big display of oratory. In the afternoon there was a baseball game, and in the evening a dance. The most suitable space for the dance was the fire hall.

In keeping with the day, the caretaker of the fire hall came down with a medal pinned on his shirt.

A lady looked at the medal for a moment, learned that the man had seen service in the navy, and asked:

"What rank did you hold?"

"I was made ship's optician, madam."

The lady seemed puzzled, and said, "I didn't know there was such a rank in the United States Navy. What did you do?"

"I scraped the eyes out of the potatoes."

If you tell a man anything it goes in one ear and out the other. If you tell a woman something, it goes in at both ears, and out of her mouth.

HANDICAPPED

He was a fire buff. His wife was not. She was getting tired of his many nights away from home.

He was away from home when there were large fires, and he was absent when there were meetings of the fire company, or the buff society.

After hubby had been away practically every night of the week, for one reason or another, his wife became quite bitter towards the situation.

As he came home late one evening, she remarked:

"I suppose you've been to see a sick friend—holding his hands all evening?"

"If I had been holding his hands," he remarked, "I'd have made some money."

The more society dames try to keep up a front, the more they let down the back.

THROUGH THE FRONT

They had been tipped off concerning a fire that was to be set. Police were on hand to watch. They saw the suspect go into the building. After waiting for a while to permit him to start his fire, they entered the building. He could not be found. The Chief hurried around to all possible nooks.

He rushed out of a door where a guard was posted. Crestfallen the Chief admitted, "I guess he got away. Did you guard all the exits?"

"Yep," said the guard, "but I guess that he must have slipped through one of the entrances."

A bargain is a good buy. A good-bye is a farewell. A farewell is to part. To part is to leave. She left without a good-bye. Anyway, she was no bargain.

UNLIMITED

Olsen was a new member of the engine company who had spent his early days working around machine shops and garages. He was always finding so-called improvements, and before they could be approved, they had to be described in a report to the Chief.

One day the Chief made a tour to the station and spoke to the Captain.

Asked the Captain:

"Don't you think that Olsen has some original ideas?"

"Yes he has," said the Chief, "especially in spelling."

Golfers have been known to tell the truth. One called another a liar.

NOTICE!

Due to fire in our warehouse there will be no interruption in our business.

Rosen Material Co.

RA. 3347-48 859 S. Front

The way they advertise "Fire Sales" in New Orleans.

SOMEWHAT SMELLY

Golf is very much of a sport in communities away from the large cities, for golf links are more accessible, and in some places, the golf links are owned by the town for use of residents.

A few of the firemen attending a short course utilized a free afternoon to play some golf. A city firemen thought that he would tag along to learn something about the game. As the game progressed, he was invited to play.

Imagine the city fellow's surprise as they pulled up towards the flag on the last green, when the host stopped and pointed:

"Just look at that—a dead stymie."

The novice looked all around him.

He said, "I rather thought there was a funny smell around here."

PROTECTED

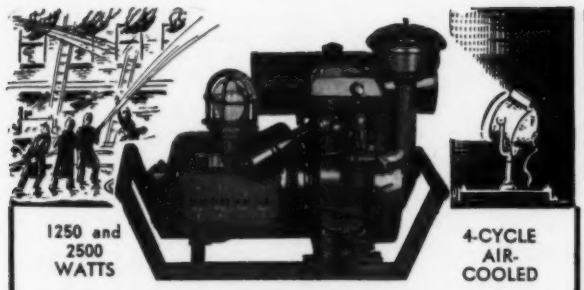
An insurance agent was very much surprised at the request for a particular type of insurance made by an attractive young lady.

Asked the agent, "Why do you want fire insurance on your husband? That won't be any help when your husband passes away."

This did not fluster the young lady.

"It's so much cheaper and I intend to have him cremated."

"What is this, Cap? A music lesson? Gee, I ain't no accordion."



1250 and 2500 WATTS

4-CYCLE AIR-COOLED

"U. S." PORTABLE LIGHT PLANT

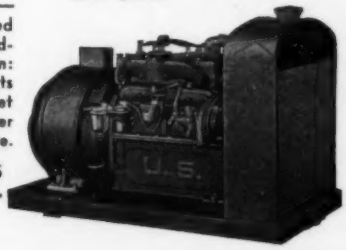
This 1250 watt, portable unit has been designed expressly for fire department use. It is small, light, compact and equipped with carriers for easy portability out on the job. Air-cooled 4-cycle engine 2⅝" bore x 2⅝" stroke. 2.4 H.P. 2 gallon fuel tank. Also 2500 watt size, same design.

We are builders of the world's most complete line of Electric Plants. In all parts of the world —arctic expeditions or tropical plantations — U. S. plants have proved their steadfast dependability. And the reason: "U. S." generating sets are designed to meet the conditions under which they will operate.

LARGER SIZES

Larger sizes are available. Illustration below is 5 KW 4-cylinder Portable Unit. Automatic remote control. Write for complete information.

Also automatic emergency units for alarm systems.



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Oshkosh, Wis.

RAISING STANDARDS OF PERFORMANCE

Hale Multi-Service Centrifugal Pumps have played a large part in the present trend toward higher pressures.

Your next pumper will have more flexible performance than your last.

SPECIFY A HALE PUMP

Write today for the Catalog and Folders on the Complete Line of Hale Pumps.

HALE FIRE PUMP COMPANY
708-716 Spring Mill Avenue
CONSHOHOCKEN, PA.

Small communities choose

HORNI COMPOSITROL

Across America, Communities with less than 300 alarms annually are turning to the Horni Type "C" Compositrol for modern, minute-saving fire alarm protection at low cost.

Engineered by Horni, this Graybar-distributed unit is factory wired and permits an unattended Central Station with outside audible alarm. It is available in both a straight metallic and a ground system. If desired, telephone communication can be maintained over the fire alarm lines.

Graybar experts can help you on fire alarm problems . . . and with all other municipal electrical needs, too. Call on Graybar for information!

OFFICES IN 83 PRINCIPAL CITIES. EXECUTIVE OFFICES, GRAYBAR BLDG., NEW YORK

CLASSIFIED ADVERTISING

Bids Wanted, For Sale and Help Wanted $5 *per inch. Position Wanted,* $2.50 *per inch.*

Dealer Wanted

Old established fire engine manufacturer looking for dealer to handle New England states. If interested write Box No. 50, c/o FIRE ENGINEERING, 24 West 40th St., New York City.

Position Wanted

Fire Chief, Age 48, 20 years experience wants change. Plant Chief, Safety man or selling equipment. North Central States preferred. Address: Box No. 60 c/o FIRE ENGINEERING, 24 W. 40th st., New York, N. Y.

Zahn Acting Chief of Ann Arbor, Mich.

Benjamin J. Zahn, who has been a member of the Ann Arbor Fire Department for 23 years, has been appointed as Acting Chief. He joined the department on August 7, 1916, at the age of 21. He worked as a hoseman for about a year, and then drove the horses until the department was motorized. Since that time, he has acted as hoseman and ladderman, and while officially holding no office, has acted as an officer in emergencies.

Chief Benjamin J. Zahn

Captain Herman Krause has been appointed as Acting Assistant Chief of the department.

Resuscitator Accepted by A. M. A.

The Council on Physical Therapy of the American Medical Association recently voted to accept the E. & J. Resuscitator and Inhalator for inclusion in its list of accepted apparatus. The report of acceptance states:

"The E. & J. Resuscitator and Inhalator may be used for producing artificial respiration by mechanical means or simply as an inhalator for providing a concentration of oxygen or a mixture of oxygen and carbon dioxide around the mouth and nostrils. The apparatus is available in three models, one portable and two for hospital service.

"The E. & J. Resuscitator and Inhalator is designed to be used in emergencies in which natural respiration has failed with resulting asphyxia. The portable unit may be employed by fire and police departments, by life guards, and mine rescue squads, and by other trained organizations rendering first aid. The hospital unit is provided for such respiratory emergencies as arise in hospital practice."

Diesel Shows Low Costs

The diesel engine powered fireboat Fred A. Busse of Chicago, Ill., has been showing low cost of operation and maintenance as compared with that of the Joseph Medill, a steam operated fireboat. With the latter, steam must be maintained at all times, but with the other, fuel is only used during actual operation.

The Busse carries a crew of six men while the Medill, to satisfy federal requirements, must carry a crew of nine men.

Chief Corrigan said that he will ask for an appropriation to buy another diesel operated fireboat to replace the Joseph Medill.

Chief Rosenstihl Has Long Record

Chief Henry J. Rosenstihl, Union Springs, Ala., claims 58 years fire department service. His father, who had served in the Confederate Army, loaned the town money in 1866 for the purchase of a pumper and also served as a pipeman.

Chief Rosenstihl believes in selecting good sober fellows for volunteer firemen and in providing them with good equipment.

Old Department Relic

C. H. Chase, Framington, Mass., a member of the Boston Sparks Association, discovered a record belonging to his great-grandfather, who at one time was Chief Engineer of the old Roxbury, Mass., Fire Department, which later became part of Boston.

The record, dated April 17, 1848, addressed to Samuel S. Chase, states:

"At a meeting of the City Council, in convention, you was duly elected a member of the Board of Engineers of the Department of the city of Roxbury for the ensuing year.

Chief Sullivan, Lowell, Retires

Chief James C. Sullivan, Lowell, Mass., has retired after serving in the department for 49 years. Eleven years ago he was appointed Chief.

He was retired under the Contributory Retirement Law.

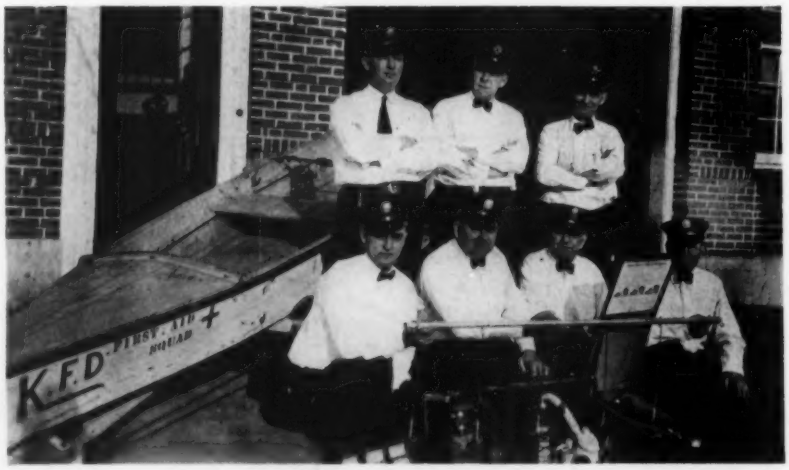
Chief Sullivan was well known and had worked his way up from the rank of private.

Are You Going to the I. A. F. C. Conference?

If you are going to the conference of the International Association of Fire Chiefs, at San Francisco, Calif., September 20-23, you are urged to write either Chief Charles J. Brennan, Fire Headquarters, San Francisco, Calif., or Jay W. Stevens, Secretary, Pacific Coast Association of Fire Chiefs, Merchants Exchange Building, San Francisco, Calif., at once, telling him when, and by what transportation, you will arrive.

You will be met by a member of the Pacific Coast Association at the depot, or other point of arrival.

When you write, state if you have already made hotel reservation, or if you wish to have reservation made for you!



First Aid Crew of Keewatin, Minn.

Keewatin, Minn., is a small town of 2,200 population with a volunteer department. Through the good work of a county safety inspector, a first aid team has been trained weekly. The photograph shows the crew and some of the first aid equipment.

INDIAN FIRE PUMPS

for

Roof Fires
Grass Fires
Room and Partition Fires
Rubbish Fires
Awning Fires
"Mopping Up"
Uses only clear water.
Rust-proof tank. 50 ft. stream. Carries by hand or on the back.

Send for catalog.

D. B. SMITH & CO., 406 Main St., Utica, N. Y.

Used by Boston Fire Department 10 Years

WHEAT SPOTLIGHT

25,000 Candlepower
2,500-Foot Beam

Costs less to operate than dry-cell lights and gives *more light.* Light does not fade; focuses at any angle. Shoulder-strap permits use of both hands.
Burns 1,000 hours without battery replacement; recharged without taking apart. Spill-proof; weighs only 97 oz. Either Spotlight or Floodlight reflector.

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Coupling Expanders
Pump and Hydrant Valves
Hose Racks and Cabinets
Siamese Connections
Underwriters' Industrial Extinguishers

34 years service in the fire field

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Prompt service Quality products

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Send for illustrated folder on the New Elkhart Mystery Nozzle.

ELKHART BRASS MFG. CO.
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DIAMOND BRAND

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ASSURE COMPLETE PROTECTION
REDUCE WATER DAMAGES

NEW and improved type—lighter in weight—easier spread—double cemented, water-tight seams—made to conform to the rigid requirements of New York City Fire Patrol and Newark, N. J., Salvage Corps.

SAMPLES AND QUOTATIONS ON REQUEST
THRU YOUR LOCAL DISTRIBUTOR OR WRITE US

DIAMOND BRAND CANVAS PRODUCTS

Official Canvas Goods Manufacturers for Boy Scouts of America

Borden Ave. & 21st St., Long Island City, N. Y.

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CENTRIFUGAL ROTARY

ESTABLISHED 1886

WATEROUS COMPANY - ST. PAUL

EDDY Fire Hydrants

Are given preference by so many fire protection and water works men because they know that more than half a century of experience goes into their manufacture and they embody valuable and exclusive features.

Write for the Facts

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Waterford, N. Y.
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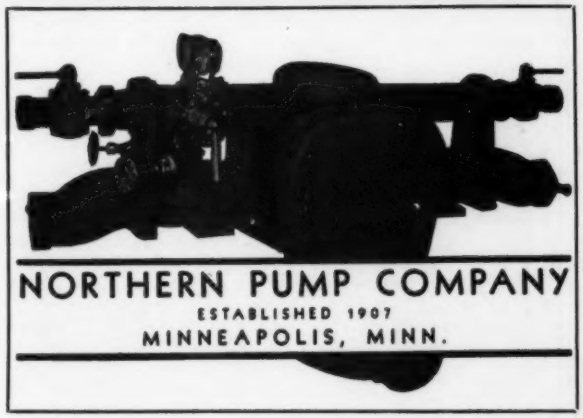

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ESTABLISHED 1907
MINNEAPOLIS, MINN.

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THE CHOICE OF FIRE CHIEFS EVERYWHERE

TRAINING NETS
LIFE NETS
LIFE BELTS

Write for bulletin

ATLAS FIRE EQUIPMENT CO.
22 WARREN STREET NEW YORK N. Y.

RUN A Big BATTERY OF FLOODLIGHTS

with this SMALL HOMELITE GENERATOR

One good thing about a Homelite Portable Generator—it gives you plenty of power. With it, you can operate several brilliant floodlights or spotlights. You can give your men all the bright flickerless floodlighting they want—where they need it and when they need it.

And another good thing—an 1,800-watt Homelite Generator weighs only 83 pounds complete with built-in gasoline engine. It's small enough to fit on a running board and light enough for one man to carry. It requires no manual attention. No long cables. Its voltage remains constant automatically. And, in spite of its size, it's the strongest, toughest, most dependable and economical unit you can find. No wonder there are more Homelite Portable Generators fighting fires today than all other makes combined.

See a Homelite at Work

Before buying any portable floodlighting unit insist on a Homelite demonstration. One of our many demonstration and service trucks will gladly show you everything a Homelite will do, anytime you want. Absolutely no obligation. Write for more information.

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ADVERTISING INDEX

AUGUST, 1939

ADVERTISING PAYS IN FIRE ENGINEERING

	Page
Aluminum Ladder Co.	363
American-Marsh Pumps, Inc.	360
American Rubber Mfg. Co.	364
Atlas Fire Equipment Co.	369
Bi-Lateral Fire Hose Co.	364
Braxmar Co., C. G.	360
Cairns & Brother	364
Cover, H. S.	364
Diamond Brand Canvas Products	369
E. & J. Mfg. Co.	363
Eddy Valve Co.	369
Elkhart Brass Mfg. Co.	369
Eureka Fire Hose Division of United States Rubber Products, Inc.	Back Cover
Federal Electric Co.	359
Fulton Bag & Cotton Mills	360
Gamewell Co.	334
Goodyear Tire & Rubber Co.	333
Graybar Electric Co.	367
Hale Fire Pump Co., Inc.	367
Hewitt Rubber Corp.	364
Homelite Corp.	370
Kerotest Mfg. Co.	359
Koehler Mfg. Co.	369
LaBour Company	331
Mack Trucks, Inc.	Inside Front Cover
Midwestern Mfg. Co.	363
Northern Pump Co.	369
Pirsch & Sons Co., Peter	Inside Back Cover
Sealand Corp., The	364
Smith & Co., D. B.	369
Sterling Siren Fire Alarm Co.	364
United States Motors Corp.	367
Waterous Co.	369

DON'T MISS

THE ANNUAL FIRE CHIEFS CONVENTION NUMBER

of

FIRE ENGINEERING

to be issued September 10

This issue will not only be our biggest and best but it will also have the largest distribution in our history.

An outstanding advertising opportunity for fire equipment manufacturers and others with a message for fire officials. Reserve your space immediately—forms close August 28. Regular rates apply—no increase.

FIRE ENGINEERING, 24 W. 40th St., New York

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MULTIPLE WOVEN FIRE HOSE

Eureka—and only Eureka Fire Hose can deliver more pressure with greater safety for longer periods—because—Eureka, and only Eureka—gives you these four advantages:

1 MULTIPLE WOVEN CONSTRUCTION

Eliminates dangerous wriggling, writhing under hydraulic pressure . . . allows no dirt or dampness to collect between plies.

2 SMOOTH-INTERIOR FILLER-PLY

Gives the rubber lining a perfectly smooth and level backing . . . no "washboarding" . . . instead, a perfectly smooth waterway assuring minimum friction loss.

3 BOMB TESTED RUBBER LININGS

Improved lap-seam . . . 4 plies of specially developed long-lived rubber . . . calendered into one homogeneous body . . . proved far superior by the Bomb Test—a scientific method of predetermining the aging characteristics of rubber goods.

4 MILDEW PROOF FABRICS

All fabrics used in Eureka Fire Hose are antiseptically treated to prevent the formation of mildew and rot. Treatment does not add weight to hose—is absolutely reliable . . . hose is easy to handle.

FOR GREATER PROTECTION TO LIVES AND PROPERTY... SPECIFY EUREKA!

Paragon 3-ply Multiple Woven Fire Hose—heavy duty—3 distinct plies—all circular woven—contains Smooth-Interior Filler-Ply—*new* and *improved* lap-seam, long-lived rubber lining.

EUREKA *Streamlined* FIRE HOSE

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